

Bob Cooper's

AUGUST 15 2006

SatFACTS

MONTHLY



Reporting on "The World" of satellite television in the Pacific and Asia

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Measurements:
Low cost meter**

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NZ Transition
to digital**

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Homecast
eM-150**

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- ✓ 177W???
- ✓ Observer Reports



Vol. 12 ♦ No. 144

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Specials this month

DT800PVR - Digital Receiver



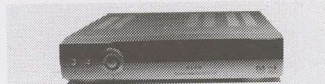
- 40Gb HDD = 40hr Record time
- 2x CI CAM Slots
- DiSEqC 1.2
- **Fibre Optic Output Capability**
- Price: \$390 AUD + GST

Satlook - Signal Meter



- Digital, Analogue and combined versions available
- A must for the professional
- Simple menus and functions
- Price: Phone up for Quote

DreamMAX - DT470



- Irdeto embedded
- 4900 Channel Memory
- DiSEqC 1.2
- User Friendly
- Price: \$200 AUD + GST

Everything? Yeah we got

LNBF

- Zinwell C Band
- Zinwell KU Band
- MTI C Band, Superhigh gain
- One Cable Solution - CBand
- Dual Output KU 11300 MHz

Positioners

- Superjack EZ-2000
- Superjack DP-6600, DiSEqC 1.0/1.2
- Technosat DP-200, DiSEqC 1.2
- Manual Actuator Driver - EW101
- SAP 2000: 99 Memory positioner

Actuators

- Superjack HARL-3618, 18" Actuator
- Superjack HARL-3624, 24" Actuator
- Superjack DG-120, H/H Mount

Receivers

- SuperNET CA, Irdeto Embedded
- Success, Free-to-Air
- Dion DT-370, Free-to-Air Receiver
- Dion 2x CI, Hardware AICAMed
- ChangHong, Mediaguard embedded
- SuperNET Terrestrial, DVB-T
- Phoenix High Definition STB

Dish and mounts

- 1.2, 1.8m Solid Prime focus
- 45, 60, 65, 85cm KU dish Offset
- 2.13m, 2.27m, 2.4m, 3.0m, 3.07m, 3.7m, Mesh Dish, Light and Heavy Duty PSI and JOYSAT Available
- CBand Wall brackets
- CBand Concrete mounts and stands
- KU Gutter mounts
- KU Wall mounts
- KU Float mounts
- KU Tinroof mount

Dion 818 CI - Digital Satellite Receiver



- Slim Size and User Friendly OSD
- 2x CI (Common Interface) slots
- Hardware AICAMed

SuperJack H-H Actuator, DiSEqC embedded



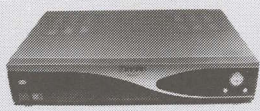
- All it takes is one coaxial cable....
- NO MOTOR CABLE REQUIRED**
- DiSEqC Positioner EMBEDDED!

Supernet - Terrestrial DVB-T



- Digital Terrestrial Receiver
- Slim Design
- High Quality Picture
- Easy to install and use

Dion316 - Digital Satellite Receiver



- FTA + Software Patched
- 4000 Channel Memory
- DiSEqC 1.0/1.2 Compatible
- Price: \$170AUD + GST

Switches and Splitters

- 2 and 4 way DiSEqC switches
- 0/22kHz switches
- 2 and 4 way cable splitters
- V/H Multiswitch
- 0/12V Switch

Cable - 15m, 25m, 305m packs

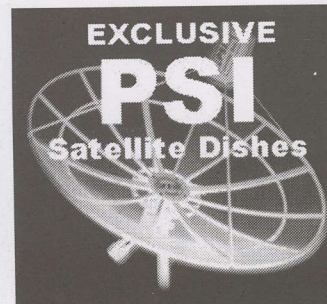
- RG6-U Dual Shield Coaxial Cable
- RG6-U Quad Shield Coaxial Cable
- Cat5 Actuator Cable

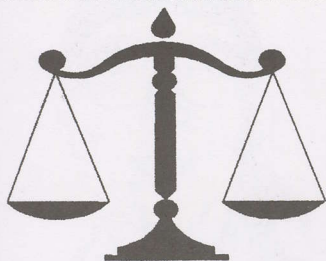
Plugs

- F Connectors, Screw or Clamp types
- Cable joiners
- AV Splitters
- Cable Strippers
- Cable clampers
- Various other joiners and accessories e.g. RCA/SCART cables and converters

Misc

- 2.4GHz AV Sender
- Irdeto 2.06B CAMs, Viaccess CAMs
- Satlook Digital Signal Meter
- Satlook Analogue Signal Meter
- Satlook Digital + Analogue combo
- Satellite finders
- Angle level measure instrument
- High Quality Compasses



PROGRAMMER
PROGRAMMING
PROMOTION

UPDATE

AUGUST 15, 2006

Hidden features of DVB-T

"I recently looked at the local terrestrial digital channels on a card-equipped PC and several things surprised me. The two commercial HDD channels available, here (WIN and Southern Cross Ten) do *not* air ads! When there is a commercial break, the video becomes a track of scenery while the audio is silent, or has background music; commercial TV without commercials! The audio on SBS's standard definition is MPEG-1 (according to the PC cards display) while all other SD channels are MPEG-2. The audio on the HDD channels certainly has a greater dynamic range - voices and sounds are far more real, even on a two speaker PC audio system - on a 5.1 surround sound system the audio would be brilliant."

AI, NSW

Interesting observation from rural NSW.

Any other reports of a similar nature?

Massive bone yard?

"I completed a 10,000km, 8-state-7-week driving holiday through western USA/Midwest and was amazed at the number of derelict and abandoned (in place) C-band dishes, in favour of Ku. Is this a trend, a sign of the times? Also, the quantity and quality of cable TV there leaves much to be desired. TVNZ, how about a footprint down here in SE Aussie for all of your ex-pat Kiwis who would like to keep up with things from home!"

Jeff Silvester, Victoria, Australia

Sadly, a sign of the times although as Mike Kohl (www.global-cm.net) points out, C-band continues to offer nearly 1,000 (!)

FTA + subscription channels. Back in 1994, more than 2,000,000 homes had C-band subscription service - today that numbers hovers either side of 100,000, and dropping. The Ku guys have simply outsold the C-band promoters at every turn and twist.

SelectTV saviour?

"Read where SelectTV has only achieved 3,500 subs. Can WIN as new majority owner fix this?"

VJ, NSW

For Au\$23.5 million or \$6,714 per subscriber, they certainly hope so!

Why FREEVIEW is not (tm). An exchange of letters between the New Zealand Commissioner of Patents, Trade Marks and Designs, and TVNZ, pinpoints why FREEVIEW will not have a (tm) designation. To TVNZ: "The Commissioner must not register a trade mark that describes a characteristic of the goods or service. FREE is defined as 'without charge' and VIEW is defined as 'the act of looking at'. The mark (requested) therefore describes telecommunications services that enables the consumer to view their television, e-mail or internet free of charge. The Commissioner also must not register a trade mark that has no distinctive character. Because of its descriptiveness the mark appears to lack the capacity to communicate that the goods or services on which it is used are those of the applicant." So what is "FREEVIEW?" A descriptive term, 'borrowed from the UK,' which can be used by *anyone* who wishes to do so! Postscript: In March 17 (2006) letter to preferred STB supplier, TVNZ referred to, "*leading an initiative (FreeSat) which is assessing the viability of a satellite based free-to-air television and radio service.*" 'FreeSat?'

"SelectTV is not out of business!" So corrects Andrew Lamond, who found reason to question our conclusion (SF#143, p. 4). In fact, on August 11th SelectTV was scheduled to accept approximately A\$20m from the folks at WIN, allowing them, as Andrew relates to SF, "*to carry on building a business with years of service growth ahead of us.*" So, those who find this counter-Foxtel/Austar plan interesting, should get behind the effort with full enthusiasm. WIN saved SelectTV's bacon.

It is official - because they say it is official! NZ's Ministry for the Environment claims there are currently 3.4 million TV sets in the country, which works out to 0.85 sets per unit of population. Close behind, cell phones (3.3 million) with computers a strong but distant third (2.5 million). Now, using *their* number (we have to ponder counting TV sets in commercial establishments), at NZ\$200 per TV set we have an analogue to digital transition "cost" of \$680,000,000. And that does not include the VCR/recorder world of which the average is one per household - another 1,000,000 which adds \$200,000,000 (at NZ\$200 per conversion) to the equation. SatFACTS suggested (SF#143, p. 8) this would top a billion dollars. *Bugger.*

TBN charges? Christian Television from the TBN Network, claims some installers are charging 'extra fees' to tune in the B3 bouquet package that includes, TBN, The Church Channel, JC-TV and Smile of a Child. TBN's Owen Sunnex also claiming "some installers are asking for monthly subscription fees for these channels, paid directly to the installer." That is obviously a no-no as all four TBN programme channels are FTA and plan to stay that way on B3 (12.658V, Sr 30.000, 2/3). The same package is also available on C-band (I701 at 180E; see 'Transponder Watch' tables here).

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NASA unfair?

"Why does NZ only require a 1m Ku band dish to receive NASA-TV while most folks in Australia require a 3.7m or larger? This is in my opinion unfair. I have been trying to convince NASA that 1701 is not an option, going down hill each year. Why doesn't NASA get on AMC23 where at least the Australians will have a decent signal?"

David Leach, NSW

Actually, NASA's TVNZ relayed service is now kaput (on Ku band) so NZ is back to where Australia is - C-band only from 1701. Try convincing not NASA but the US Embassy in Canberra that NASA needs to shift to AMC23.

Circular Polarity C-band?

"Am looking for detailed information on constructing a home-brew linear to rhc/lhc waveguide squeeze other than the traditional 'Teflon plate.' Any thoughts? By the way, very much enjoy your (www.bobcooper.tv) videos but believe have seen some of them previously."

John Roder, Christchurch

Conversion of RHC or LHC to linear, such as required with some Intelsat birds, has always been a lose-lose proposition. ADL (the company) built high quality feeds to do this in the US\$400 region a decade ago but sold out to Patriot who if (IF!) they will accept such an order want twice as much and 90+ days to fulfil. The Steve Birkill "International Satellite Television Reception Handbook" covers the Teflon slab approach using a Chaparral feed.

Garry Cratt at Av-Comm P/L

(www.avcomm.com.au) has supplied his own design RHC and LHC feeds for 15 years or longer and he may have one or more "gathering dust" he would be willing to part with. The ADL RP3-CKU was the top of the line ADL product while the RP1-CP400, CP300 and CPOR-100 are also worth a look - possibly on eBay? As

for www.bobcooper.tv, the videos scheduled through mid '07 are ALL extracted from TVRO's Fifth Birthday Party" 2 hour HBO telecast (1984). We are presently converting the 15 hours of SPACE Pacific's one hour AsiaSat 2/Optus distributed TV shows to DVD and by October will have this set available on 3 DVDs. At Satellite Expo 2007 in Atlanta, there will be more than 50 hours of DVD-retrieved C-band-era videos constantly running on four monitoring stations including some of the legendary Shaun Kenny pieces ("Yellow Rain," anyone!).

Do I have to attend...?

"...the C-band reunion dinner or buy a book I will never read to attend the reunion itself?"

Brian S, California

Simple answer - no. The 3 day seminars and general attendance is an option.

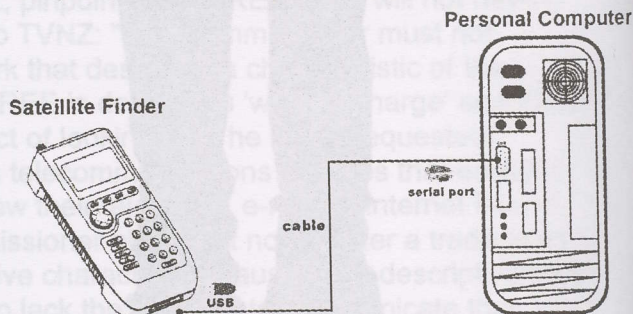
HARDWARE EQUIPMENT PARTS

UPDATE

AUGUST 15, 2006

Internet support is increasingly more difficult to ignore if you want to stay current in your technology. Example: The SF 3000 meter (p. 7, review) attempts to be 'future-proof' by providing

tools to download its up-to 80 field memory positions into a PC, and to update the original base-factory loaded memory from "the web." By dumping to a PC your field measurements, they are retained for future reloading back to the meter while the instrument will stay 'current' with the latest satellite information through the software disk provided and an Internet connection.



Sky NZ hiccups? Blame it on Optus, B1, or even Sky but transponder outages during July and early August continue to plague the Sky NZ service from B1. Example: Ten minutes, 12.671V, July 29 from 2:30 - 2:40PM. Cross your fingers, toes and eyes - B1 is limping to the finish line.

North American piracy is in great turmoil attracting major press coverage, especially in Canada where Nagra encryption system has been violated repeatedly. Asian, primarily Chinese, receivers equipped with self-updating software selling under 'brand names' including Neusat, Coolsat, Viewsat and Pansat, have with recent changes in CA data stream quit working - by the tens of thousands. Hardest hit has been US programmer Dish Network and Canadian programmer s, all users of Nagra encryption.

INSAT 4C will be replaced after launch-phase failure resulting in satellite being blown up by ground command. When? "Within a year." The 12 transponder Ku-band bird was fully sold out before launch, failure sets back Indian Ku DTH by however long it takes to get new bird in orbit.

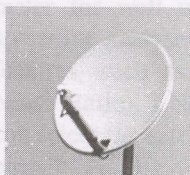
177W for NZ? A new teleport capable of provide 12 programme channels to 70cm region dishes (12 dB C/NR) in NZ could be broadcasting from this location by sometime in September. When they do, there will be a full run of SPACE Pacific Reports (15 hour long programmes) and much more from SatFACTS - details (hopefully) in our September issue!

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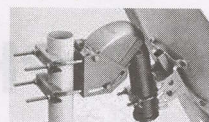
Phoenix 2800A \$100
The Best FTA Available
Quantity price available



Dreamax DT470 \$110
Irdeto 2 Receiver
Perfect For Selectv



**Zinwell 15K
LNBF \$25/each**
for box of 24



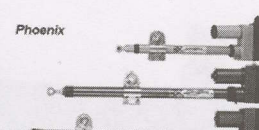
**Motek SG2100
Mo-**



**SuperJack EZ2000
Positioner \$50/each**



**Motek V Box II
DiSeqC1.2 Positioner
\$65/each**



**Phoenix
Actuator from 12' standard
duty to 36' heavy duty
From \$35/each to \$220/each**



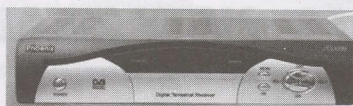
**RG6 305m
Dual shield
\$65/box
Quad shield
\$85/box**

This Months Specials

Irdeto 2.06B CAM	\$110	PBI C+Ku band LNBF	\$65
Viaccess CAM	\$110	Zinwell C band LNBF	\$35
65cm Azure shine offset dish	\$28	Phoenix Ku band LNBF	\$20
75cm Azure shine offset dish	\$40	MTI C band LNBF	\$25
85cm Azure shine offset dish	\$45	MTI one cable solution LNBF	\$45
One leg gutter mount	\$18	Satellite finder	\$25
Two leg gutter mount	\$22	RG6 stripper	\$20
Tin roof mount	\$22	RG6/RG11 crimper	\$30
Wall mount	\$15	Angle meter	\$35
Superjack H-H motor	\$95	Compass High Quality	\$10
2.3m SD mesh dish	\$130	RG 6 Crimp Connector 100 pack	\$25
3m SD mesh dish	\$340	22K switch	\$10
3m HD mesh dish	\$380	Two way DiSeqC switch	\$10
3" 2.5m galvanised pole	\$30	Four way DiSeqC switch	\$12
3" 3m galvanised pole	\$35	Satellite 2 way splitter	\$1.50
3" 3.5m galvanised pole	\$40	Satellite 3 way splitter	\$2
3" Triangle Pole for C band dish	\$50	Satellite 4 way splitter	\$2.50
Speaker Stand for caravan use Ku dish	\$45	Prosignal LED Easy to use Satellite Meter	\$85



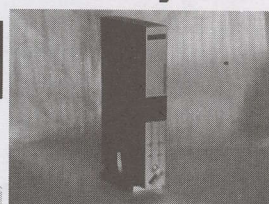
**Phoenix JT-3300B
Digital Terrestrial Receiver
\$100-1 buy \$85-5 buy**



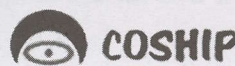
**Special Phoenix PVR-3600
Terrestrial
80 GB Hard Disk Recorder
Easy one touch record \$220.00ea**



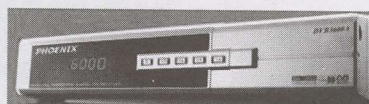
**Star 2880 FTA Receiver
\$80 ea Min 5 Buy**



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Sat/Terrestrial
\$165 ea**

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Best performance



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Last
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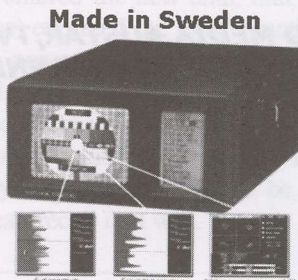
**\$1500/
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**Triax 64cm KU Dish
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To Align on The
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Wide Beam Width
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SATLOOK Digital NIT \$1395

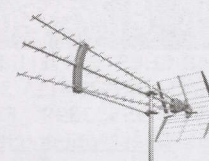
- Satellite-receiver 920-2150 MHz.
- Spectrum-analyzer with expanded spectrum.
- Digital BER, QPSK and S/N-ratio.
- 4.5" B/W monitor for PAL/NTSC/SECAM.
- Tuneable sound 5.5 - 8.5 MHz.
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- DiSeqC control (1.0, 1.1, 1.2).
- KU- and C-band (normal/inverted video).
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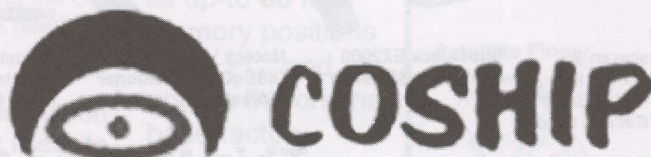
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A "Reasonably Priced" Satellite DIGITAL Meter

To paraphrase Bonner Martin, "My old satellite meter died and was not worthy of repairing. I did not wish to spend too much money as I am approaching the end of my working life so two to ten thousand dollars seemed like an unwise investment. I searched Internet and located an interesting meter for well under NZ\$1,000. No, it does not have a spectrum analyser but it does have a number of important features, such as: BER (Bit Error Rate), SN/R (Signal to Noise Ratio), LNB values, Symbol Rate (SR) values and it can select the satellite you are after out of an array of multiple birds."

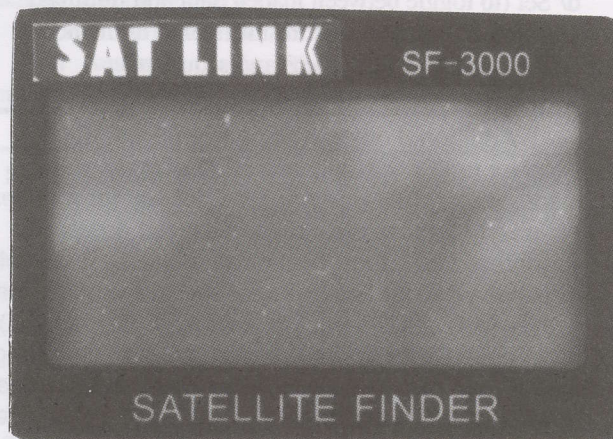
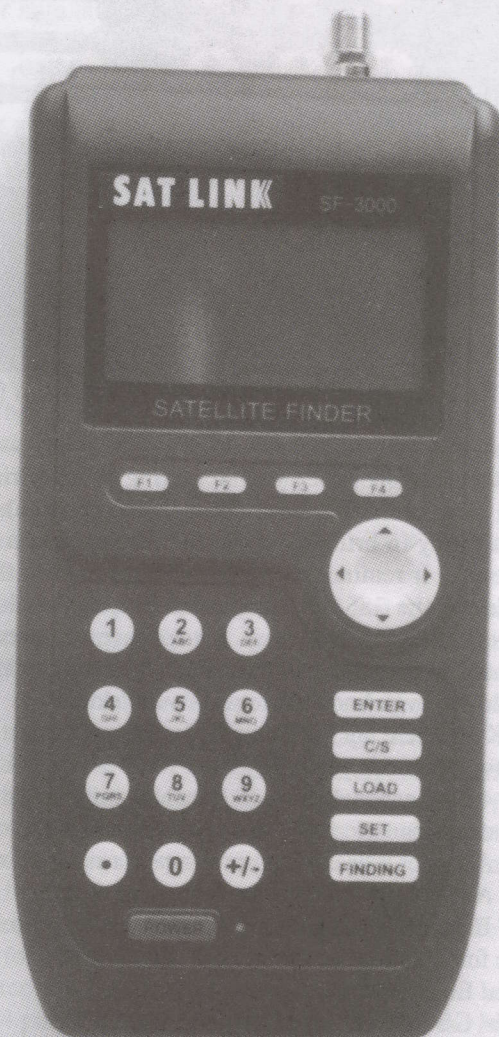
This is an instrument that creates "relative values" for any installer of satellite dishes - it is not a laboratory instrument with +/- 1 dB (or better) hard numbers. But for 99% of what every installer does (and will do in the future), the SF 3000 is an indispensable tool that allows you to locate the correct satellite, peak for maximum signal and of equal importance rotate the LNB feed polarity to locate the "null point" for opposite polarity signals. The technical specifications are found on p. 8.

Bonner: "The meter arrives properly packed with foam protection and it has a sturdy look about it. The function buttons are decently spaced for clumsy hands (or someone standing on their tippy-toes struggling to maintain balance on a roof!) and easy to properly operate. The instruction manual - well, there is my job. It is sizeable (84 pages) but done in what I must label 'Asian English' which I found difficult to understand, much less follow. I can see where someone who has a limited background in satellite work would grow confused and even reach a frustration level approaching giving up the task because of the manual.

"This meter is very easy to operate provided you understand a few of its unique quirks. There is one that is totally missing in the manual - guaranteed to increase your blood pressure.

"It begins when you have entered a new set of numbers for a particular satellite and wish to save the data for future use. The manual outlines a 'save' procedure and seemingly that would be complete. It is not. What they neglect to include is a crucial final step: Having entered the new data, and, having (following their instructions) executed the 'save' function, you must (make that MUST!) power down (turn off) the meter after each 'save' is entered. Yes, this might be considered an annoying extra step but the alternative is far more annoying; you lose the previously entered data! But this is only an extra step when you are initially entering new data to be saved - once it is in memory, you can recall it at will.

This review uses material created by Bonner Martin (BonnerMartin@entersurf.co.nz) as he was preparing a new English (language) set of simplified instructions for the SF-3000 (Satellite Finder) meter. His instructions are now routinely supplied with all meters purchased from the NZ and Australia source(s) here.



Satellite Finder's display (screen - actual size) provides menu entry instructions and measurements through 950 - 2150 MHz "L-Band."



The buttons, controls which lead you from function to function as described here.

"About which. When you are setting out to retrieve data (go to a new previously entered memory position), there is a slight delay in bringing up on the display screen the selected material. It reminds me, a proud 'old timer' in the computer world, of the 386 era computers. But, again, this is not an end-of-the-world situation. If you have not previously been exposed to meters costing as much as ten times this one, you would not even know that it is - well, 'slow'."

OK - so here are the Bonner Martin version instructions.

Below the screen you will see...

1/ 4 buttons labelled F1 to F4 which are used to action most of the entries

2/ A rocker wheel with 4 positions for navigation

3/ A telephone type key pad for entering data

4/ Below the 4 position navigation rocker wheel there are 5 keys for:

- a/ Enter (to enter information)
- b/ C/s (to clear an entry)
- c/ Load (for loading data)
- d/ Set (to toggle between loaded data and findings)
- e/ Finding (to review test results stored in memory)

And now to the operating steps and sequences.

Additional observations from SatFACTS

Not unlike virtually any LCD display of this configuration, photographing the display for use here is nearly impossible - something the designers encountered with their own manual illustrations (which explains why our illustrations 'look like' simulations; they are). A LED backlight (push F3 at turn-on) marginally improves the display but frankly in bright sunlight, you may have to 'shield' the display to read it. Bonner Martin's material, excellent as it is, basically ignores the built-in capability to download to a PC records or update the meter itself through Internet. These are important features, worthy (perhaps at a later date) of their own review.

SF-3000 Digital Satellite Finder

Model: SF 3000

Input frequency range: 959 - 2150 MHz (L-band)

Input connector: 'F' male (BNC adapter), 75 ohms

Signal level range: -65dBm to -25dBm

Symbol Rate range: 1 (or) 2 Msps to 45 Msps

LO (local oscillator) frequency range: 4500-5500, 9500-11,500 MHz

Initial Configuration: Enter your location (longitude, latitude)

Aiming config: Indicates correct azimuth and elevation settings for dish from your location to desired satellite

Satellite identification: Prestorage of factory entered satellites

New satellite: Enter (from www.lyngsat.com) satellite longitude

Load Record: Previously loaded satellites saved to memory (your option) for comparison of 'then' and 'now'; 80 memory positions

Additional Satellite entry: User can add satellites to memory function

LCD indicators: Bar relates signal level, audible tone frequency increases as indication of peaking signal (works on analogue signals)

Support indicator: Audible 'beep' when correct satellite is found, loaded; LCD screen flashes 'OK'

LNB support: 13 (vertical), 18V (horizontal) LNB switching

22 kHz switching: supported

Downloading (from web) data: 'Findmaster' software supplied with meter on disc - cable supplied for direct connection to meter, updating all satellite data (p. 31, manual; supported by www.easysatfinder.com)

Display: LCD with LED backlight (F3 turn on or off)

Battery: 5 hour initial charge time for first 3 charges (8.4V Mh-Ni format); disconnection from charger urged after 5 hours (do not leave on charge overnight!)

Battery charger: 10.4Vdc 1 amp, 110-220VAC +/-10%

Battery warning: Beeps at 7.7V charge level, auto turn off when charging required; battery charge display

Simultaneous operation-charging: Not recommended that charger be used as voltage supply for longer than 10 minutes

Battery use: 4 hours typical field use

Dimensions: 250 x 120 x 60 (mm)

Net weight: 0.8Kg (instrument only)

Gross weight: 1.6Kg (instrument, case, accessories)

Functional temperature range: 0-40C

Display (LCD): 128 x 64; backlight enhanced

Audio output: Built-in speaker

Port: USB (default)

Accessories: Power supply adapter, (optional) cigarette lighter adapter, F to F transition adapter, instrument bag, data cable, PC disk

Sources: The SF 3000 meter is a world-available product. In NZ, Satlink (www.satlinkz.co.nz) stocks the unit (tel 027 493 7025). In Australia, John's Electronics, P.O. Box 174, Albury, NSW 2640 (www.johnselectronics.com.au)

tel 61 2 6041 3388, fax 61 2 6041 3047
and mobile (61) 0418 698 106

Load Satellite:			
▶61.5°W Rainbow 1			
61.5°W Echostar 3			
63.0°W Estrela do			
65.0°W Brasilsat B			
↑	↓	EXIT	OK

If the satellite you wish has been pre (factory) loaded, you begin by selecting it. No, Optus B1 will not be there.

Your longitude and latitude?

This is clever. By telling the meter where you are (on earth), you create a display which becomes a major assist in properly identifying each satellite as the dish is moved. Confused? Read on!

1/ Go to 'Utility' 4th icon using the F2 button (the icon resembles a hammer and spanner)

2/ Enter using F4

3/ Change the values to suit you

a/ Options relative to signal level readings include dBuV (decibels above 1 microvolt), dBmV (decibels above 1,000 microvolts - 1 millivolt) and dBm. Use F4 to select your choice (dBuV being the most common in the Pacific).

4/ Using F2, you can go down to '2 Longitude' and '3 Latitude' and change values to match your own location parameters using the number/alphabet key board (see factory provided instructions for proper use of keyboard; p. 24/25). To determine your own Latitude and Longitude, see the following (NZ): <http://www.niwasience.co.nz/services/tides> or see <http://www.ga.gov.au/oracle/geomag/agrfform.jsp> if you are located in Australia.

a/ While doing set-up, select 'Shutdown Time' from 3 minutes, 10, 30 or 'always on' using F4 button (this will help you not forget to turn it off thereby saving the battery).

5/ Exit by using F4 button

And now we 'edit' unwanted materials from memory.

Deleting unwanted satellite data

1/ Go to 'Downloads' right hand icon using F2 button (icon looks like letter 'C' back to front)

2/ Enter by pushing F4

3/ Go to 2 and delete unwanted configurations by using F2

4/ Enter under OK F4 button

5/ A list of all satellite entries and test data (if any) will now appear. Use F4 to delete and F2 to go down the list,

	AZ: 41.1°	
	EL: 35.7°	
	PO: 30.6°	
	PRE	OK

For satellites that are 'in memory' you next enter where you are to create azimuth and elevation aiming parameters from your location to the bird.

deleting all entries you don't need (there are satellites here of no interest to you)

6/ Exit by using F4 button

Entering (new) satellite data

1/ Go to 'Configuration' centre icon using F2 (icon looks like a square inside a square)

2/ Enter using F4. If you wish to exit without changing anything shown, use the C/s button (right hand side of meter)

3/ To navigate around the screen use F1 and F2

4/ When you are at the value you wish to change, push F4 to access the item, change the value and exit again by pushing F4. Note: When entering a longitude value, east satellites (180E to the 'west') are a '+' while west satellites (179E and lower) are '-' values. NSS5 at 177W is therefore '-177'. Push F4 to exit.

5/ Change values to suit the satellite and transponder. You enter settings separately for upper and lower (example: Sky NZ's half transponder format) as you wish. Note: On a vertical or horizontal transponder you can set the LNB voltage to the opposite (polarity) voltage allowing checking the rotation of the LNB for null or lowest reading. This will ensure that you have set the LNB for its maximum gain and least crosstalk between vertical and horizontal polarisation. (Go to <http://www.lyngsat.com/asia.html> for individual satellite information).

6/ After entering details for a transponder, navigate to 'save' with F1 (or F2) and push save 'F3'

7/ Enter new details, using numeral/alphabetical key board and the 4 position navigation rocker to move to the next letter to be entered. Make sure you do NOT use the same saved details as another entry.

a/ 160.0 E Optus B1 for transponder 12.456 (NZ)

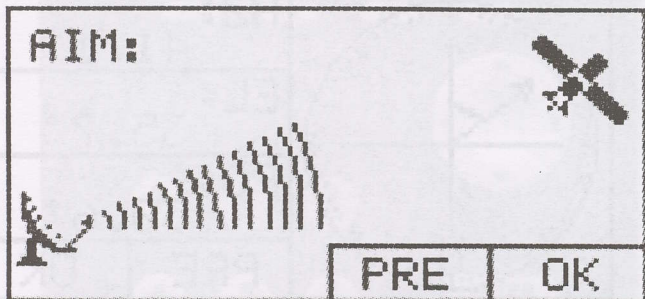
In Australia, using B3 or C1, substitute appropriate numbers)

Manual satellite configuration (see text) involves adding to memory the distinctive satellite parameters for the new bird of interest.

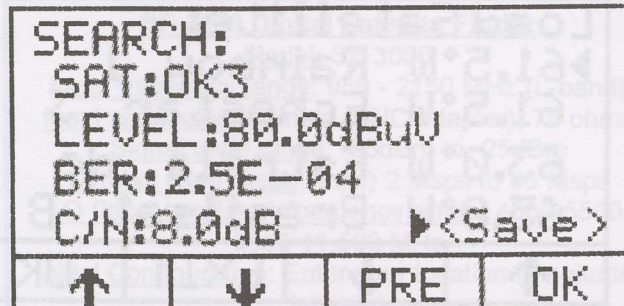
Configuration				
←	→	⏏	OK	

Selected transponder parameters are identical to what you might enter into a STB to initially load it for a manual search.

CONFIGURATION:	
LO:11300	F:12301.0
SR:25600	LNB:18V
L:146.0°	22KHz:Off
QPSK:Auto	▶<Save>
↑	↓
SAVE	NEXT



A satellite search produces a search-mode display as the antenna is swung east-west seeking to acquire a satellite signal.



A companion audio beep will indicate the satellite has been found, the frequency of the tone will rise indicating more signal, and the display will report.

b/ 160.0E Optus B1 483 FV for transponder 12.483 FreeView

c/ 160.0E Optus B1 483VNU for transponder 12.483 measuring LNB vertical null (has horizontal LNB setting)

8/ Save settings by pushing F4 (you may have to push F4 twice)

9/ IMPORTANT: Turn power off (red button lower left) and then on again to ensure the setting is not lost when you make the next entry. Failure to do this may make the next entry overwrite the previous entry.

Finding a satellite position

1/ Go to 'Load' 2nd icon using F2 and push F4 to enter

2/ Enter configuration using F4

3/ Select satellite required using F2 and F1 buttons and push F4 to enter

4/ Check detail and push F4 which will take you back to the 5 primary icons

5/ Go to 'Finding 1st icon with F1 button and push F4 to enter

6/ Go to '3 Orientation' using F2 and enter using F4. From this you can set the satellite dish azimuth. The value shown is from true north (reference) and is correct if you are using GPS. If you are using a compass, remember to take into account the variation from true north as a result of magnetic north (in New Zealand, Northland is 17 [degrees], Bay of Plenty 19.5, Wellington 21.4 and Southland 24.4 - corrections to be calculated into the compass magnetic headings). You can check <http://www.pangolin.co.nz/almanac/magvar.com>, or through a nearby local aeroport (in Australia). When using a magnetic compass, stand a minimum of 3 metres distance from any metallic objects [including the dish if metal!] when taking readings. The meter will also compute for you the elevation to the satellite

and if your co-ordinate information is accurate, you will now be pointed at or very close to the desired satellite.

Maximum signal from the satellite

1/ Follow the steps immediately above ("Finding A Satellite position"), /1 through /5.

2/ At this point you have a choice of going to '2 Aim' and using the Aim Meter which acts like an upmarket hobbyist sat-finder, or, going to '1 Search' which is the more professional approach. This uses the signal level meter, gives you the frequency you entered for the transponder, signal level, BER and signal to noise expressed in dB. Using this choice, when you have located the correct satellite, the meter will 'lock on' and the display will advise 'OK' in top right hand corner.

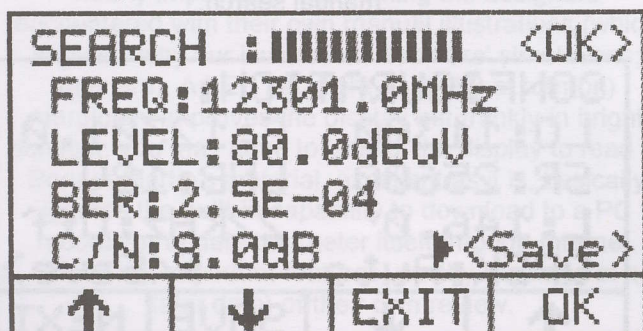
3/ Using search under 'Finding 1st icon is easy and works properly. Slowly pan the dish from side to side. If you have been accurate with your setting of azimuth and elevation, the dish variance (movement) should be small as you will see the signal level climb, indicating you are on 'a' satellite. However, if it does not 'lock' and the phrase 'OK' does not appear, you are on the wrong satellite (!). Pan left and right until it locks and says 'OK'. Now, carefully and slowly adjust the azimuth and elevation of the full dish to peak the signal. Two steps remain. Slowly, carefully, move the LNB in and out of its holder while observing the signal level. And finally, rotate the LNB for maximum signal. Once that is done, tighten the clamps and exit with F3.

4/ Follow the steps in "Finding A Satellite Position" /1 and /2. This time, enter the transponder details set up for 'nulling' the LNB. Exit with F4.

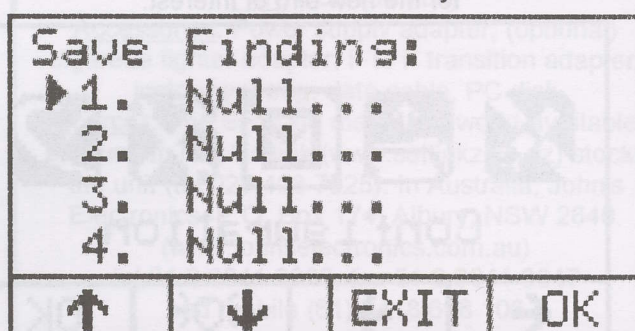
5/ Go now to 'findings' and enter with F4

6/ Enter 'search' with F4. Rotate the LNB for lowest reading. You will not reach zero as the meter will eventually indicate (at null) the background noise floor - always greater

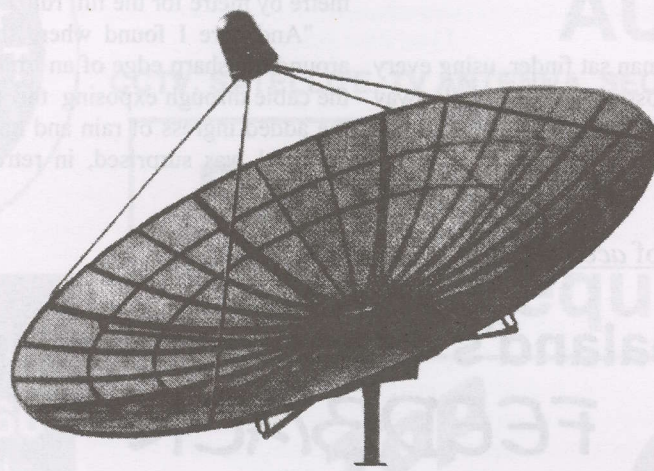
After successful search the meter can be toggled to display the actual signal level in the measurement unit you have selected (dBuV shown here).



By reversing polarity (switching LNB voltage on dual-pole LNB) the null reading can be displayed and recorded in memory.



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be nice to be able to access different transponders (on the same satellite) without entering a new configuration.

"The meter's ability to find a particular satellite out of a group of satellites is very handy and with the Bit Error Rate (BER) and signal to noise ratio, this makes a very handy installing machine. And by entering a null-point reverse setting so you can get the most out of an installation, you are miles ahead of the competition. Here is an example, real-world, of an experience I found.

"I set up a dish using a \$45 handyman sat finder, using every ounce of decades of experience I possess. Then I took away the satfinder device and used the SF 3000. Net result? a gain of 2.5dB in overall signal level!

"Another example? A Sky customer in my area was complaining of frequent (too frequent!) blue-screen 'rain fade' graphics - when it was not raining. The original installer came, checked the system out, found nothing wrong and left. The problem persisted and I was called in. Checking the signal level (and BER) at both the dish/LNB, and, then at the decoder end, I found a major deterioration in both at the decoder. The only possible answer was a cable fault which was then checked metre by metre for the full run.

"And here I found where the cable was tightly wrapped around the sharp edge of an iron roof. Yes, the edge had worn the cable through exposing the screening and foil - which with the added ingress of rain and moisture had started a corrosive action. I was surprised, in retrospect, the system worked at all."

Primary problem? Shortage of accurate information!

New Zealand's Transition to digital: FEEDBACK

SatFACTS #143 reported in some depth all that was known (whether announced formally or 'leaked' through sources such as contacts at TVNZ) about the now official decision by Government to expedite the transition from present-day analogue to future-day digital, in New Zealand. This transition will launch modestly late this calendar year and ramp up over the period through 2008. During this initial period, the framework will mature, some early concepts will be trialed and if found unworkable, abandoned. HDTV (high definition TV) was not considered essential to the launch of digital in New Zealand, although pay-TV provider Sky NZ is planning to launch several channels (sport, movies) using this technology. The nearest similar transition plan to that now taking shape in New Zealand is in the UK where, also, the original plan ignored the HD version of digital initially. A recent rethink of that decision (SF#143, p. 14) finds the BBC now testing HDTV in the London area with every indication this technology will become a normalised offering within 12 months or less. The BBC's roll out of HDTV has been prompted by the UK pay-TV provider's decision to roll out HDTV for satellite subscribers, a move that left the BBC in a catch-up posture. It is not unreasonable to expect a similar "Us too!" take-up of HDTV in New Zealand as SKY NZ's rollout of this added-value service comes into play.

Reaction to SF#143

Reader IF (Qld), always an incisive student of our technology, suggests SatFACTS may have misinterpreted a number of technical details in the information published. And this points up the problem here - a lack of technical detail as released by TVNZ leaving interpretation to detail in the wrong hands (perhaps ours!) where a more complete and honest set of information might have avoided misinterpretation. Alas, not all of the comments responding to our #143 issue report dealt with the technical aspects of the transition, as you are about to discover.

IF: "SatFACTS may have a slightly different understanding of the meanings translated from the detailed listing appearing on pages 9 and 10. My interpretation is they are describing a

system similar to the Aurora software version found in the UEC642 STB. Specifically, I read that they want STB software which is incapable of holding more than one platform in memory while also making it impossible for the STB to even load many platform formats.

"As I read the required specifications, they seem to want receivers preloaded with the 'Home Transponder,' in a manner similar to Aurora UECs and Austar/Foxtel receivers, changeable only by the uplinker over-air (eg. as was done with the Austar/Foxtel receivers after the B3 to C1 move).

"They seem to want the receivers to 'auto-NIT load?' If this is correct, this would probably prevent the receiver loading SCPCs and MCPCs which have no NITs or wrong NIT information. What the 'auto-NIT load' on the UEC also does, as I found out when Globecast swapped T7's NIT with T5's, is that it allows the uplinker to move the receiver from one transponder to another, without any intervention by the viewer (i.e. 'no need to rescan').

"You mention in 'Editor's Note' on item '5.3 - the receiver should advise the viewer of the need to rescan.' Perhaps there is another interpretation of this item. The UEC642 automatically changes channel labels, auto-PIDs, auto-PMTs (it can add extra channels and delete channels). The uplinker can prompt the STB to NIT-load extra MCPCs.

"The LCN (logical channel number) specifications (eg. 5.2, 5.4) are a worry. The UEC software uses a LCN system where, for example, 'Central Seven' always loads as channel 7 which makes sense if you only have Aurora loaded. If you then attempt to load another MCPC (eg. Globecast's T5), there will be a new service telling the UEC it wants to be loaded as channel 7. The receiver becomes confused (two conflicting sets of instructions) and sometimes the original channel 7 is eliminated, or without warning, the new channel will not load. In fact, the UEC (which comes closest to being a 'model' for what NZ proposes) will not even load two Globecast MCPCs together because both have common LCN allocations/instructions. LCN? The potential to be 'mis-used' by the programmer(s) to prevent 'FreeView' users from 'wandering off to some other service,' a concern.



ELECTROCRAFT AUSTRALIA

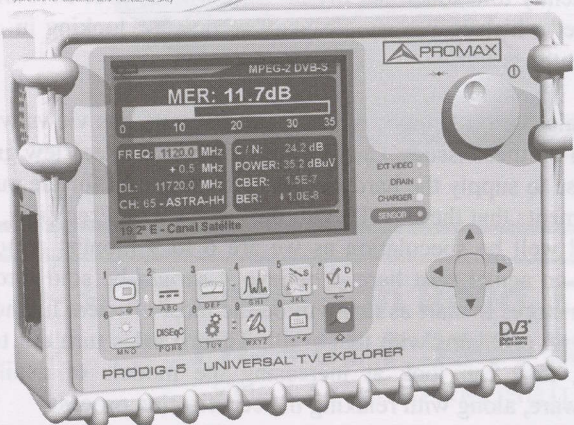
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* No picture for encrypted signals. The service list and PID is displayed.

TVNZ modifies Free-to-Air channels digital platform: B1

In preparation for the availability of B1 replacement satellite D1 (launch announced for unspecified date in September), late in July TVNZ scheduled a transition from the original 12.456GHz to 12.483GHz. The change required (most) STBs to be rescanned for 12.483. After the change, previously available NASA TV has been dropped leaving the line-up as follows:

- (1) MTS/Maori Television, (2) TVOne (Wellington), (3) TV2 (Wellington), (4) TVOne (Christchurch), (5) TV2 (Christchurch), (6) Bloomberg, (7) DWTV, (8) CCTV9 and (9) TVNZ Wide.

TVNZ advises, "This is the first change in (our) experimental platform in preparation for FreeView (note how they are currently spelling the word!) ... these channels including CCTV9 and DWTV may not be included in the FreeView Bouquet."

Editor's comment: TVNZ in shutting down one of their two (half) transponders may, in fact, be responding to Optus requests that present users of B1 "scale back" their operations *until* D1 is launched.

"I also notice there is no specification for the receiver to be able to invert for C-band, so it is quite probable the receiver will not function on inverted signals (this would include C-band of course plus some UBI MCPC's as well as some SCPC feeds).

"I also think you might have misunderstood item '5.7/Hidden Services'. You might be correct (suggesting this refers to PIDs hidden by the uplinker) but what I think it possibly means is *purposefully* 'hidden by the viewer'. An example - if 'Fox News' loads as channel 13, and the viewer decides that he *never* wants to see that channel, he can make it 'hidden' so it no longer appears on the channel list and even by pressing 'channel 13' it does not appear. This is slightly different than 'deleting' a channel because in this way channels 14 and up will retain their correct LCNs.

"The mandatory inclusion of a SCART cable (you suggest 'it might be an innovation') is in my view strange and unnecessary; additional supplier cost for virtually no user benefit. I am guessing that in New Zealand, as here in Australia, (TV & VCR) SCART connectors are very rare. Perhaps there is a clue here as to which receiver the consortium has already pre-selected as their recommended choice; a receiver sold in Europe where this cable is standard? How do you spell Thomson??? It would be an interesting exercise to lay the specifications on SF#143 pages 9 and 10 side by side to the detailed, published specs for existing receivers from a couple of European-popular brand/models. It would not surprise me to notice a very high (even 100%) correlation between an existing receiver and the consortium's requirements. Why reinvent the wheel if one already exists?"

Editor's response: Let us assume for debate IF is correct regarding items which would make it difficult, perhaps impossible, for the consumer to use the 'certified STB' for any reception other than the software defined FreeView service. We see that as an interesting marketing advantage for those who do not become a favoured supplier. In promoting a receiver which *does not restrict* viewing options (LCN), does not prohibit inverted signals (C-band, plus), you will be offering more, greater user utility. "*This receiver does more than limited FreeView*" with a suitable explanation of how a competitive unit allows "TRUE Free2View of all that satellite has to offer, not limited to New Zealand-only services," could be an effective sales message.

Additional comments

"I actually think I have some sympathy for TVNZ, for a change. The experimental FTA platform has gone on for some time now (see material at top-editor) and quite a number of us have become dependent upon it. I think we should pull our collective heads in, for the sake of 'the greater good', of the transition to the 'real FreeView'. We're looking forward to a

very exciting next 12 months with a ton of spare capacity that will get filled up with all manner of wonders and I'm sure I will manage to avoid long-term having to stick an ugly 3m C-band dish in my back yard which I have been threatening just to get full-time reception of quality foreign news channels." (Selwyn Osborne)

Following is a communication originally sent to Peter Esscher at SatLink following publication of SF#143.

"I am wondering how much feedback you have received regarding your FreeView status? I have mixed feelings and I'd like to share them with you in the interest of good business relations. While it was a very clever move of yours to ask for FreeView in your name, I struggle to see the point. It seems the object of the exercise was to be a smart ass and piss-off TVNZ. I think you have achieved that. Unfortunately, there will be those who think the FreeView concept/system will be great for them and who will see your move as a stumbling block to their ability to fall in line and market their own business along with the FreeView name.

"I can only see that TVNZ's launch will be an absolute windfall for you. I have always held the philosophy, 'Don't bite the hand that feeds you,' which I believe applies in this instance. And this brings me back to the question; 'what was the purpose of your crafty move?' I am not saying I would not have done the same thing if I had known in time, my purpose would have been to make a quick buck and perhaps that is your intention. But I think it would be a shame to stuff up the plan for the balance of us. I hope this gives you some food for thought as to how others may feel or think about this issue." (Frank Cochrane, Frontline Otago, Mosgiel)

And Esscher's response: "You mention 'there will be those who think that FreeView will be great for them,' and sadly Frank, as the system is currently planned, only one company will benefit. This is where it is all wrong; the plan is designed to control the market (through favoured retailers and one favoured 'certified' importer). With this in place, TVNZ has frequently told folks like myself they will 'control 80% of the market' which leaves people like you outside, looking in. And this is the issue!"

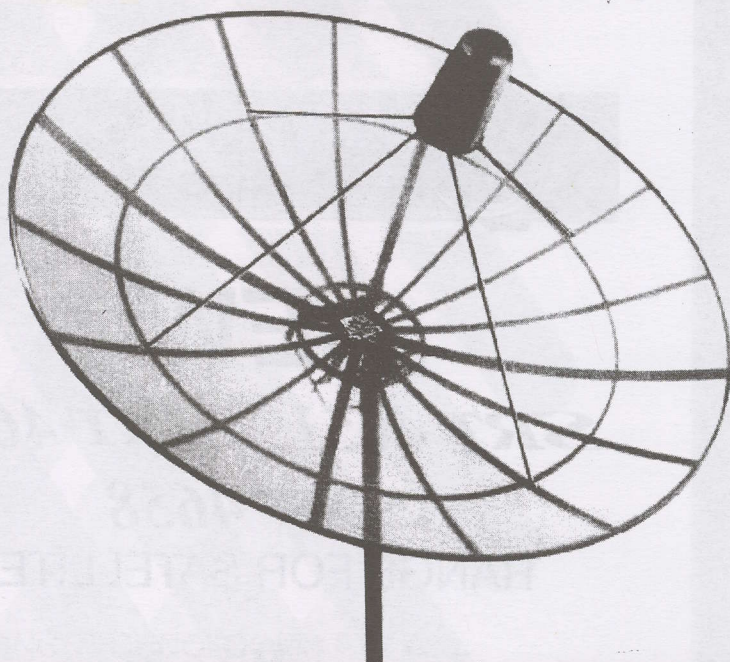
Craig Sutton, creator of www.apsattv.com, has views which touch on these issues. Craig writes, "Who the FreeView group choose to supply the hardware is up to them. As for the public statements that these STBs will only work with FreeView, that could well be speculation as we are 6 to 9 months removed from an actual start here. I believe it *should* be sold through chain stores to start as this will be the most efficient method; I have no problems with that at all. Then if sales turn out to be poor, they can look at increasing the models of available hardware, along with relaxing the certification process.



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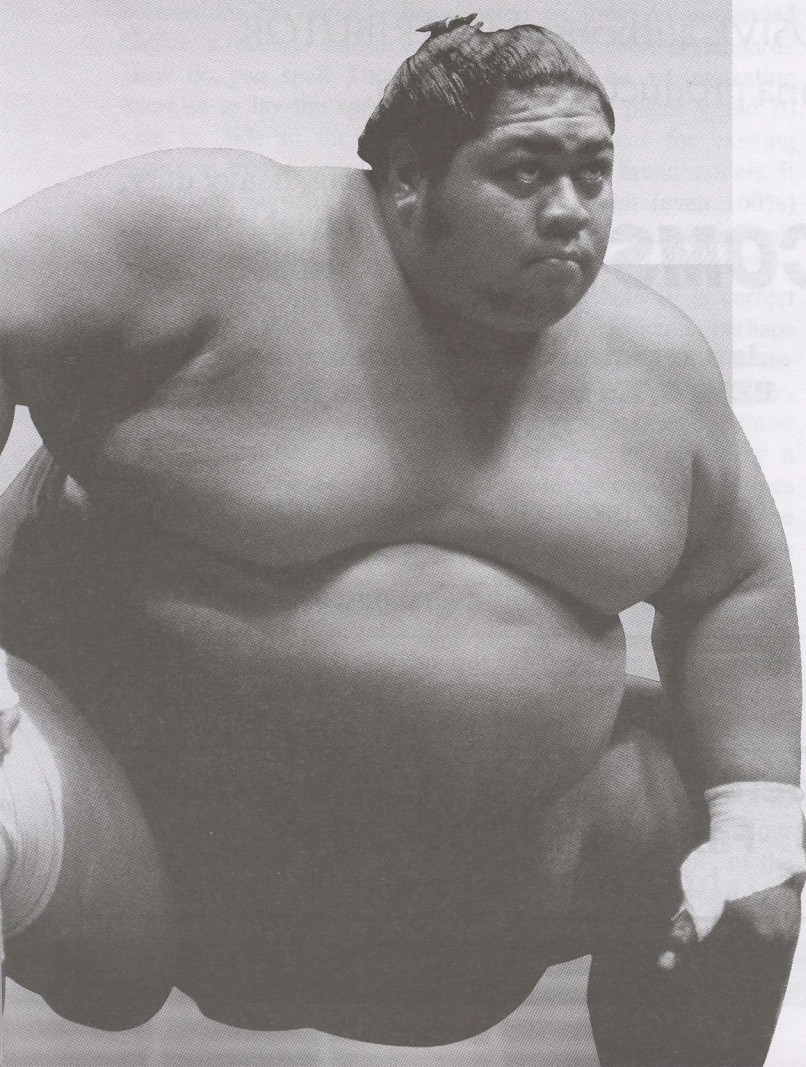
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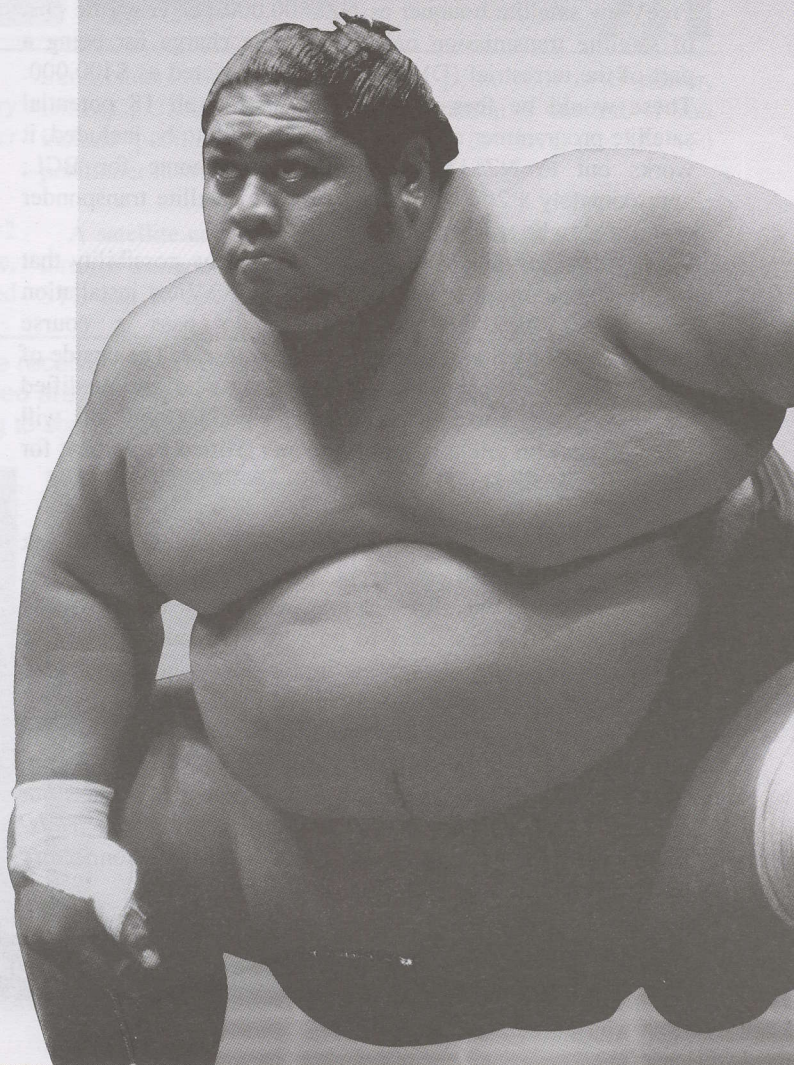
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"As for my take on which channels will be available, perhaps it will look like this:

"(1) TV1 Wellington, (2) TV2 Wellington, (3) TV3 CanWest, (4) TV4 CanWest, (5) TV 'a' CanWest, (6) TV 'b' CanWest, (7) TV 'c' CanWest, (8) TV 'd' CanWest, (9) Maori TV, (10) TV1 Christchurch, (11) TV2 Christchurch, (12) TV 'e' TVNZ, (13) TV 'f' TVNZ, (14) Trackside, leaving room for 4 additional TV channels, plus of course radio from at least (1) Concert FM and (2) National Radio.

"SF#143 seems to be suggesting that TVOne and TV2 Auckland, presently available FTA through the SKY NZ transponder (12.671V), would also have to be carried within the FreeView package, which if true would reduce from 4 to 2 the unused FreeView channels (beyond those required by the services listed above). I have no special insider knowledge here but surely it is in the best interests of both sides to continue the FTA 12.671V carriage within the SKY bouquet."

One press report quotes the cost of being a part of the FreeView satellite bouquet as NZ\$800,000 per year (the cost of satellite transmission only), while the charge for being a part of the terrestrial (DVB-T) bouquet is stated as \$400,000. These would be fees to BCL/THL and if all 18 potential satellite programmer channels paid \$800,000 to be included, it works out to NZ\$14,400,000 (annual) income for BCL; approximately a 200% "mark-up" on the satellite transponder rental cost to be paid by BCL.

"I understand TVNZ is also discussing the possibility that before someone can be included in the FreeView installation programme, they will be required to pass a course (administered by the consortium, one supposes). The upside of this is that the consortium will list those who are 'qualified installers' using 'certified equipment'. I ponder how this will effect those who might be offering non-certified equipment for sale." (JT, Wellington)

Editor's note: 'Certified installers' is a logical and quick follow-on to 'certified equipment.' One can imagine how local Noel-Leaming outlets, for example, will post a list of 'locally available certified installers' to go with their sale of 'certified STBs' creating yet one more hurdle for those who do not wish to be a part of a consortium-organised FreeView roll-out.

"Auckland-region repair and installation firm (TISCO) used newspaper story in the July 24 North Shore Times to report, 'TISCO is one of two companies that over last two years has assisted TVNZ with its satellite and terrestrial digital trials.' Expect there to be 'Certified cable' and 'Certified F connectors' next!" (Ted D.)

FreeView? Don't settle for less!

One group offering you new Digital TV systems from satellite restricts your viewing to a maximum of 18 (future) channels. Caution!

TRUE FreeView includes a '**dual-head dish**' system with *future* access to ALL 18 of the consortium-promised FreeView channels plus **ALL** of the *currently* available following (free to air!) - no subscription required!

Australia 7 Network, WA CentreLink, SBS Australia, EWTN (Catholic), KurdSat, Hope Channel, Oman Satellite TV, TVR International (Romania), Abu Dhabi, Russia Today (English), DMC Channel (Thai), ERT Satellite (Greek), Thai TV Global, 3ABN, The Church Channel, Daystar TV, Max Asia (Hindi), TRT International (Turkish), TBN USA, The God Channel, Smile of a Child, JCTV, BVN-TV (Dutch-Flemish): **23**

EXTRA TV channels plus 16 radio channels

NOT available on a single-head-dish.

FreeView? Don't settle for HALF view!

Two-heads are 23 channels better than a single head!

A group calling itself "The Tight 4" is creating advertising promotion built around the text you see above. FreeView competition? You bet!

Editor's note: In fact, 'certified cable' appeared in NZ the week of July 31. Maser, importer for Times, announced 'FreeView Cable' which has the name already printed on the cable. This has obviously been months in planning and preparation to get the cable from North Carolina to NZ. so imprinted!

"Bonner Martin's plea that FreeView launch using MPEG-4 (SF#143) is correct in all respects except timing. I can assure you FreeView will migrate to MPEG-4 within two-years of launch. The consortium had actually favoured '4' but when the Ministry made a public announcement '*receivers will cost under \$200*' that sealed the fate of MPEG-2 at launch. Why? 'Under \$200' *might* buy a '2' but at this time it will not pay for a '4'. As 4s become more common, this will change." (Name withheld on request)

Editor's note: So a mis-statement by a Ministry official sealed MPEG-2 as a

launch format. A slip of the tongue, inadequate information to begin with, and there went HDTV!

The New Zealand Herald (August 1, page C4) devoted a sizeable page to "*the ruckus over digital*" reciting material previously appearing in SatFACTS, but glossing over the lack of HDTV via FreeView. It did quote an unnamed TVNZ source suggesting, "*FreeView may not be the service name when we launch.*" Right on.

A dark-horse entrant, scheduled to launch NZ beam service as early as 1 September (later is likely) from 177W, threatens to be a 'spoiler' in all of this. Unfortunately, technically the 23 degree offset (160E/B1 to 177W) is a difficult technical challenge for one dish/two (or more) feeds. See page 1, here. What you can expect from 177W (48/47 dBw: 72cm dish size) is some interesting reception industry materials, at least initially - including the full 15 x 1 hour 'SPACE Pacific Reports'. Too bad Australia - out of footprint for you!

Editorial synopsis (to presstime): While Peter Esscher may not be everyone's (or anyone's) candidate for most respected fellow in the NZ satellite industry, he has at least identified a number of potential problem areas which others are ignoring. Perhaps, as Craig Sutton offers, "these are early days and it will all sort out."

The primary question we see is whether New Zealand TV viewers, given an entirely new, fresh slate and forced to abandon a decades-friendly TV system, have any interest whatsoever in TV from 'distant points.' Between B3 at 152E and NSS5 at 177W, there is C1, B1/D1 (the home for FreeView), PAS-8 and AMC23 - all potentially capable of producing quality images with 60-72cm dishes. Alas, one dish-multiple feeds is a technology to be refined for New Zealand; exciting times indeed are *almost* here!

Homecast eM-150: "Connecting your Digital Dream"

The endless search for the perfect receiver, whether as a satellite hobbyist do-everything machine or for the home that wants more than one-service reception, continues. And those clever software people who keep expanding the ability of what standard receivers will do continue to burn the midnight oil. This is no easy task because once someone has created a better approach to any signal finding and processing task, the competition quickly dissects it for their own use. A ninety-day lead in this industry is an eternity.

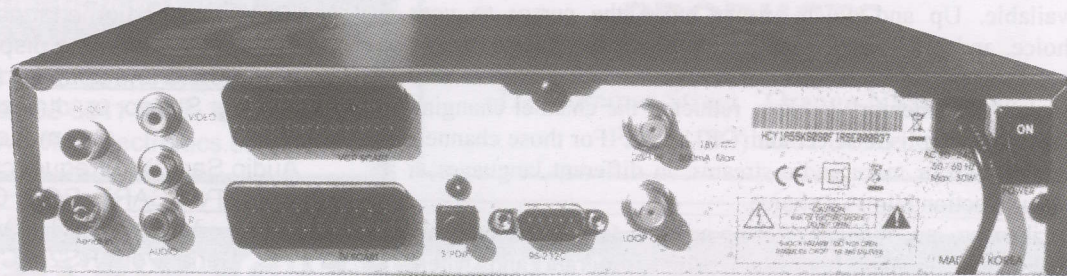
The Homecast em-150 is a mature, nothing important missing STB available through at least two established, reputable distributors. There are receivers available with their own 'ninety-day-wrinkles' which may, briefly, be desirable but for the longer haul (short of buying a new receiver every 90 days) an all-the-basics covered STB is perhaps a better choice.

Basics first

The unit comes out of the box pre-programmed with 32 factory loaded satellites. First you select the proper satellite, and the menu changes to display the pre-programmed



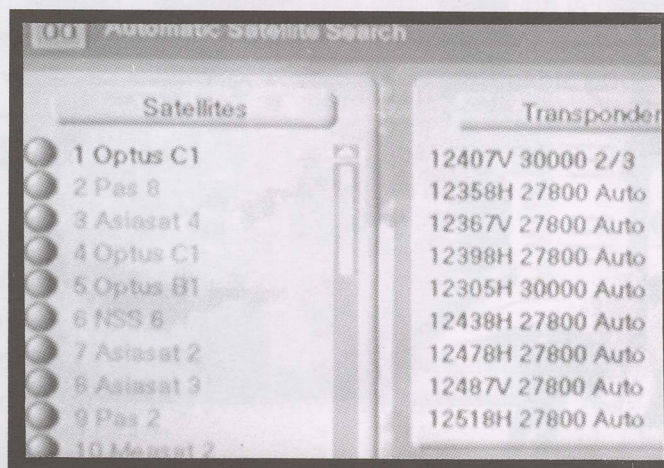
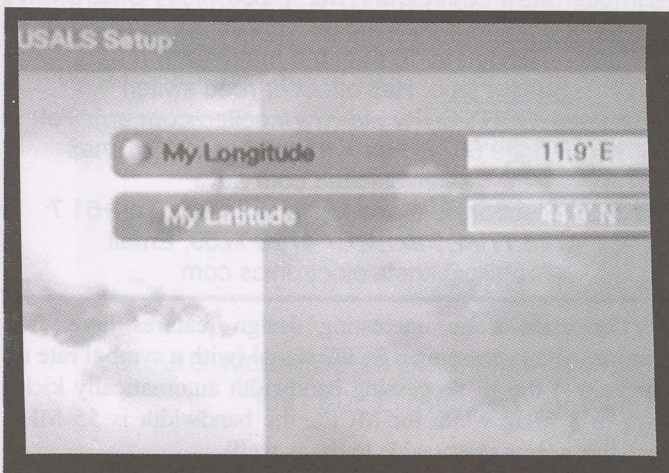
Versatile FTA + STB handles a variety of software seamlessly.

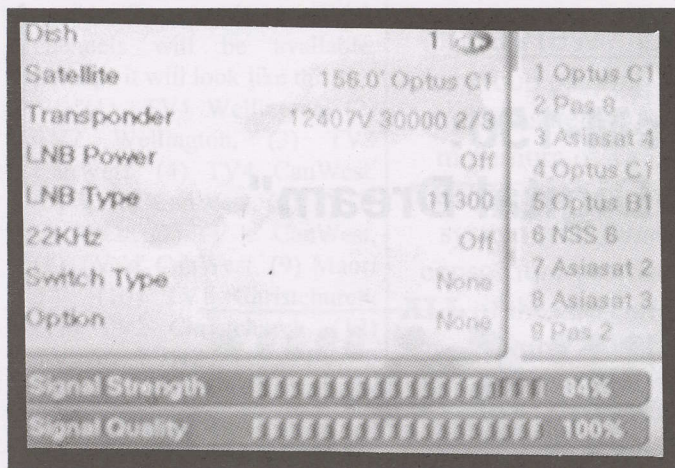


transponders located there. At this point your LNB power, DiSEqC, USALS dish system information is entered. If you include positioner the next step is to slave the eM-150 positioner instructions to the motor.

A satellite can be searched (1) automatically, (2) manually through a single transponder search. Similarly, data from one STB can be transferred to another. Unused satellites can be

By entering your location (longitude and latitude) the receiver becomes a "look angle" calculator for the dish controller function (left). Transponders factory-loaded are identified by on-screen memory with parameters displayed leading to scanning modes.





From memory (or loading steps) transponder selected registers signal strength and quality (bar at bottom).

deleted or edited in memory, channels individually can be renamed and rearranged in sequence to suit the user.

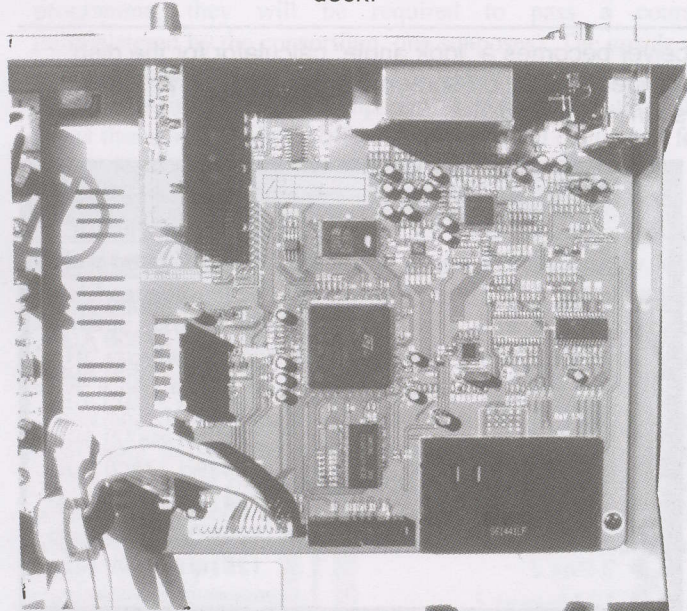
Models available are FTA only, FTA + CI and FTA + CAS embedded. CI models support six different CAM versions (Conax, CryptoWorks, Irdeto, Mediaguard, Nagravision, Viaccess) while CAS includes a built-in card reader.

With a satellite and transponder selected, the 'OK' button brings up a menu listing the television (and radio) services available. Up and down arrows move the cursor to your choice, and 'OK' brings that service up on the screen (and in the speaker). A 'short-list' of FAVourite channels is also available for memory loading, reducing the channel changing chore to a simplistic select and 'OK' status. For those channels running two or more audio streams, in different languages, a menu selection allows a choice.

Likewise, any channel offering an EPG (electronic program guide) will display both the current program and where available a detailed on-screen text explanation of the content.

A similar option exists for Teletext and Subtitling. The RCU (remote control unit) contains a 'Text' button which when pressed will lead you to the otherwise hidden data.

Interior layout lends itself to quick service diagnosis although access to mains fuse is tricky. Perhaps someday manufacturers will move this item to the rear deck!



Homecast eM-150 STB

This is a FTA + CA (Viaccess, Conax, Crypto Works(tm), Nagravision, Irdeto and (they claim) Mediaguard STB designed for C, Ku or both usage.

Input frequency range: 950-2150 MHz (L-band)

Input signal range: -25 to -65 dBm

Input: 75 ohms, standard and loop through, IEC 169-24 female(s)

IF bandwidth: 55 MHz above 5MSPs, 8 MHz below
LNB powering: 13/18, 14/19V @ 0.5amp max (+0.5A peak)

LNB tone switch: 22kHz, +/- 2 kHz at 0.6Vpp, +/- 0.2V

DiSEqC Control: Version 1.2, tone burst format A/B

Demodulation: QPSK

Symbol rate range: 1 to 45 MSPs (SCPC, MCPC)

Storage capacity: 2,000 channels FTA (500 transponders), and, 4,000 channels (1,000 transponders)

Input rate: 15 Mbit/s maximum

Recall channels: Favourite channels + parental lock

Video: MPEG-2 MP@ML

256 colour graphic interface

Multi-language menu

4 digit, 7 unit front panel display

Audio: MPEG-1/2 audio layer 2

Aspect Ratio: 4:3 or 16:9 (selectable)

Video resolution: 720 x 576 (PAL) or 720 x 480 (NTSC)

EPG for on screen channel information with

small screen video display during EPG

Teletext and subtitles: VBI and OSD

Audio Mode: Stereo, or, dual channel, or joint stereo, or, mono

Audio Sampling frequency: 32/44.1/48 kHz

TV SCART: RGB, CVBS, L, R

VCR SCART: CVBS, L, R

Serial Port: RS232C D-sub male

S/PDIF: Fibre-optic digital audio output

RF modulator: IEC 159-2 male/female

RF modulator frequency: 470-860 MHz (user settable)

RF modulator channels: Ch 21-69

TV standard: PAL B/G/I/D/K menu selectable

Input voltage: 90-240VAC (SMPS family supply)

Power consumption: 30W maximum

Weight: 1.5kg

Operating temperature range: 0-40C

PCMCIA slots: 2 (Viaccess, Conax, Crypto Works[tm], Nagravision, Irdeto and Mediaguard)

PCMCIA format: I, II DVB Common Interface Standard -Positioner-

Azimuth/ Skew control: M1, M2, Pulse, +5V, Gnd, Skew

Output power for dish mover: 36Vdc, 5a max (time limited to 10 minutes maximum)

Sensor type: Hall effect or reed switch

Sources: SCITEQ Pty Ltd (www.sciteq.com.au), Tel

+61 8 9409 6677, Fax +61 8 9309 5210, Email
sales@sciteq.com.au

Kristal Electronics (www.kristal.com.au), Tel +61 7
4728 7704, Fax +61 7 4728 7759, Email
philip@kristalelectronics.com.

There are some interesting design features here. For example, when accessing a SCPC signal (with a symbol rate of 5 or below) the IF processing bandwidth automatically kicks down to 8 MHz while for MCPC the bandwidth is 55 MHz (yes - that seems pretty wide to us, as well).

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Along the way we have found that above all else, customer support is critical. If you look around the industry, you'll soon sort out those vendors who operate on a strictly commercial basis, and, those who really have your real hobby interests at heart.

That's why we have made it our priority to give you all of the information to help you make your hobby a success. So if you are contemplating Satellite TV as a hobby, give us a call; we'll help get you off on the best track. Who knows - you might even become a part of this growing industry!! You can count on our decades of experience to provide you with the best "right" solution at an affordable price.

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Foxtel & Austar Approved

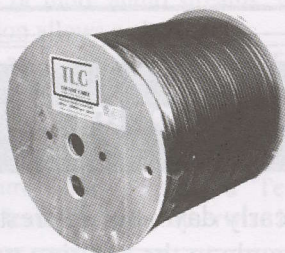
Australia's only Premium Cable



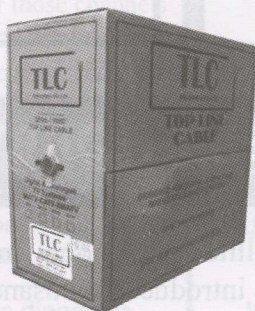
RG6 Quad Premium RG11 Quad Premium



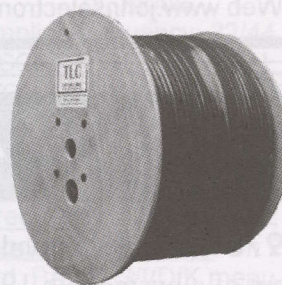
Both cables also available in flooded
100m, 305m, 500m Spools available



**RG6 Quad 305m
Wooden Spool**



**RG6 Quad 305m
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**RG11 Quad 305m
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SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 August, 2006

Bird	Service	RF/IF &Polarity	# Program Channels	FEC	Msym
Thom5/78.5	SkyChAust	3695/1455H	up to 3	3/4	5(,000)
	ANT Greece	3672/1478H	1 TV	3/4	13(,333)
	TARBS ME mux	3640/1510H	12TV, 12 radio	2/3	28(,066)
	Ch Nepal	3626/1524V	1	3/4	15(,556)
	Mahar mux	3600/1550H	11TV, 1 rad	3/4	26(,667)
	RR Sat mux	3551/1600H	8TV, 10 radio	3/4	13(,333)
	TVK Cambodia	3448/1702H	1TV	1/2	6(,312)
	TARBS/Th5	3480/1670H	12 TV+radio	2/3	26(,667)
	Thai Global	3425/1725V	up to 7?	2/3	27(,500)
InSat 2E/83	ETV mux	4005/1145V	6+ TV	3/4	27(,000)
	Hyd Dig 2E	3910/1240V	1	3/4	5(,000)
	Kairali TV	3699/1451V	1	3/4	3(,184)
	Indian mux	3643/1507V	3	3/4	19(,531)
	Sky Bangla	3430/1720V	1TV	3/4	6(,000)
NSS6/95E	Ant Pac (Greek)	11 104H-Australia	1 TV	3/4	2(,800)
As2/100.5E	Guangdong TV	4075/1075H	1TV + radio	3/4	6(,000)
	Euro Bouqt	4000/1150H	5TV, 19 radio	3/4	28(,125)
	SatLink	3960/1190H	3TV	3/4	27(,500)
	Reuters News	3905/1245H	1TV	3/4	4(,000)
	WorldNet	3880/1270H	4+/18radio	1/2	20(,400)
	APTN Asia	3799/1351H	1	3/4	5(,632)
	Reuters/Sing	3775/1375H	1	3/4	5(,631)
	Macau MUX	4148/1002V	5TV	3/4	11(,850)
	Dubai MUX	4020/1430V	4+, radio	3/4	27(,500)
	Russian/Israel	3832/1318V	up to 4 video	3/4	7(,271)
	ArabSat#2	3820/1330V	8+ video?	3/4	27.5
	Trace TV	3792/1358V	1	3/4	2(,400)
	BYU-TV	3767/1383V	1 + 20 audio	1/2	6(,530)
	3-ch miniMUX	3752/1398V	up to 3	3/4	5(,640)
	Saudi TV1	3660/1490V	7+/tests	3/4	27(,500)
Express2/103E	Various-tests	3675/1475R	2	3/4	4(,340)
As3S/105E	Chinese regionals	3671/1471V	2	3/4	8(,932)
	CETV digital	3680/1470H	1+ TV	3/4	26(,670)
	Zee bouquet	3700/1450V	10TV	3/4	27(,500)
	Ch News Asia	3706/1444H	1TV (+)	3/4	6(,000)
	Azio TV	3716/1434H	1TV (+)	3/4	7(,000)
	BTW World	3725/1425V	1TV	3/4	4(,450)
	TVB 8	3729/1421H	1TV	3/4	13(,650)
	Zee Movies	3732/1418V	3TV	3/4	6(,500)
	TV One	3739/1411V	1TV	3/4	2(,8934)
	SAB TV	3743/2407V	1TV	3/4	3(,300)
	Fashion TV	3747/1403V	1TV	3/4	2(,625)
	AAJ-TV	3750/1400V	1TV	3/4	2(,820)
	Airang TV	3755/1395V	1	7/8	4(,418)
	Now TV +	3760/1390H	up to 10TV	7/8	26(,000)
	Star TV	3780/1370V	7(+)-TV	3/4	28(,100)
	GXTV	3806/1344V	1TV + 3 radio	3/4	4(,420)
	Shaanxi TV	3813/1337V	1TV + 2 radio	3/4	4(,420)
	Anhui TV	3820/1330V	1TV + 2 radio	3/4	4(,420)
	Jiangsu TV	3827/1330V	1TV + 2 radio	3/4	4(,420)
	HLITV	3834/1316V	1TV	3/4	4(,420)
	Star TV	3840/1310H	7(+)-TV	7/8	26(,850)
	Star TV	3860/1290V	5(+)-TV	3/4	27(,500)
	Arabsat MUX	3880/1270H	10+TV, 14Radio	3/4	27(,500)
	Dragon TV	3886/1264V	1 TV	3/4	4(,800)
	Shaanxi TV	3895/1255V	1TV + 6 radio	3/4	6(,813)
	CCTV1	3904/1246V	1TV, 1 radio	7/8	4(,420)
	Jilin TV	3914/1236V	1TV + 2 radio	3/4	4(,420)
	Star TV	3920/1230H	4+ TV	7/8	26(,850)
	CNNI	3960/1190H	8TV, 1 radio	3/4	27(,500)
	StarTV	3980/1170V	6+TV	3/4	28(,100)
	Star TV	4000/1150H	8(+)-TV	7/8	26(,850)
	Sahara digital	4020/1130V	8TV, 1 radio	3/4	27(,250)
	Hubei TV	4035/1115H	1TV + 2 radio	3/4	4(,420)
	Tianjin TV	4046/1104V	1TV + 2 radio	3/4	5(,950)
	Sichuan TV	4051/1099H	1TV + 1 radio	3/4	4(,420)
	Qinghai TV	4067/1083H	1TV + 2 radio	3/4	4(,420)
	Hunan TV	4082/1068H	1TV + 1 radio	3/4	4(,420)
	Fashion/HK-Asia	4088/1062H	1TV	3/4	2(,626)
	Pakistani TV	4091/1059V	4TV, 1 radio	3/4	9(,330)
	Sun TV	4095/1055H	1	3/4	5(,554)
	PTV National	4106/1044V	1TV, 1 radio	3/4	3(,333)
	TVB8 Mux	4111/1040H	4 TV	3/4	13(,650)
	Indus News	4115/1035V	1	3/4	3(,331)
	CCTV bqt	4129/1021H	4 TV, 4 radio	3/4	13(,240)
	Zee Bqt #2	4140/1010V	8(+)-TV	3/4	27(,500)
	Henan TV	4166/984V	1TV + 8 radio	3/4	4(,420)
	Fujian TV	4180/970V	1TV + 2 radio	3/4	4(,420)
	Jiangxi TV	4187/963V	1TV + 2 radio	3/4	4(,420)
	Liaoning TV	4194/956V	1TV + 2 radio	3/4	4(,420)
Cak1/107.5	Indovision (S-band)	2,535, 2,565, 2,595, 2,625, 2,655	33(+)-TV	7/8	20(,000)
T'Kom/108E	IndoBqt	3460/1690H	up to 6	3/4	28(,000)
C2M/113E	TPI	4185/965V	1	3/4	6(,700)
	Anteve	4144/1006V	1	3/4	6(,510)
	Kabelvision Mux	4080/1070H	7+ TV	7/8	28(,125)
	Indostar	4074/1076V	1	3/4	6(,500)
	SCTV	3934/1216H	1	3/4	6(,620)
	Indo MUX	3880/1270H	3+ TV	7/8	28(,121)
	TVRI	3765/1385H	1TV	3/4	5(,555)

Receivers and Errata
CA (#1, 3); FTA audio #2
Late July 04: room for more (FTA)
CA + 23FTA(A1TV, IRB3, Visjon Norge,Pakistan)
New 03/03; FTA
Thai + Indian services; FTA inc. Vibe TV, Sindh TV
3TV, 5radio inc. Hellas TV Greece FTA
FTA
3FTA: TV5, VTV4, ATN Bangla
FTA (reaches SE Australia)
Several ETV now here; wide beam
SCPC, OK E. Aust. wide beam
SCPC, OK E. Aust wide beam
corrections 12/02
New - November 2002
Now CA; was 11.083H
July 04: FTA
FTA TV + radio; Russia,Port,Spain, Italy/Euro Bqr
Real Madrid (V769, A770) English FTA
Was 3923H; sometimes FTA
FTA; multiple audio services V2360, A2320
Sometimes FTA; also 3895Vt
FTA & CA
5 chs TV, FTA, some tests
FTA : Dubai Sports Ch some English, soccer-
Two Israel, two Russian (REN-TV)
New 107-06; initially parallel As3S 3.880H
new here Dec 2004; Euro-French music videos
Increased coverage; great variety audio chs(03-05)
Sun-TV, Surya TV, KTV (FTA)
FTA MCPC; Yemen, MBC EUROsport tests
Now loaded from 96 SE; srl below 3900 all RHC
New 07-06; Yanbian, Jilin Satellite TV
replaces analogue same freq: V33, A32
Now SECA 2 CA (10-04); Radio Aust. Eng. A2011
English + V1160, A1120; 525, 625 versions
Was parallel to 3640Hz analogue (now gone)
Conax CA, all Hindi films
Also reported 3.333, ¼ October 2005
SAB may no longer here here; moved to NSS-6?
new frequency October 2005
New April 2005; English, urdu
FTA SCPC; New PIDs V3601, A3606 June 2003
CA + FTA; DW, TV5 here now (late 2005)
NDS CA (Pace DVS211, Zenith)
Guangxi TV; was As2
Was As2
Was As2
Was As2
Was As2; HeiLong
NDS CA (Pace DVS211, Zenith)
NDS CA (Pace DVS211, Zenith)
New April 2004; link to Optus B3 Globecast
Shanghai
Apparently Mongolia
PowVu CA; new SR Apr 29; CNN radio FTA
NDS CA; Star News India FTA VPID 514, APID 648
NDS CA w/ 4(Chinese) FTA
New Sr September 2004
Was As2
new December 2004
Was As2
Was As2
Was As2
Was As2
New July 2005
new Sr, channels, April 2006
"History Channel" - SCPC, some English
MATV Ch Movies now Irdeto 1
Hindi (+ "Plus"); day parts
moved from 4115
Now SECA 2 CA (10-04); 1 occ. FTA (varies)
Was As2
Was As2
Was As2
Was As2
NDS CA using RCA/Thomson,
Pace IRDs; 2,535 has 2 FTA. Bird now inclined.
also 3586H/17,500, 3496H/19,615
FTA SCPC; NT/NC only
change from 4055V; FTA SCPC
also try 3500H, 27,000, 3/4; strong NZ
New (but probably temporary) 07-06
FTA, may not be active full time
FTA; Sr change 01/03; erratic
bounces btwn FTA and CA; unreliable (12-04)

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
	Brunei/Sing	3733/1417H	1TV	3/4	6(000)
	SCTV	3726/1424V	1TV	3/4	6(620)
	RCTI	3473/1677H	2	3/4	8(000)
As4/122E	CCTV internal	4100/1050V	6	3/4	27(500)
Jc3/128	Miracle Net	3996/1154V	3 up to 6	5/6	22(000)
	Asian bqt	3960/1190V	up to 8	7/8	30(000)
Ap6134E	Multiple	4140/1010V	up to 8	7/8	27(500)
T18/138	Tests	3460/1690V	8	3/4	30(000)
Am3/140	STS +	3731/1419R	1	3/4	3(200)
Jc2A 154	BYU-TV	3915/1245V	1+ 20 languages	3/4	4(166) (?)
MeasSs2	Astro Mux	11.602H	up to 17TV	3/4	41(500)
	VTM MUX	11.522V	3 TV	3/4	9(766)
B3/152	7 Cent. Feed	12.310H	1TV	3/4	5(100)
	AuroraBiz	12.407V	4 TV, 10 radio	2/3	30(000)
	UBI	12.425V	up to 13 TV + radio	3/4	22(500)
	Globecast 2	12.525V	13 TV, 8 radio	2/3	30(000)
	Globecast (feeds)	12.550-555V	1TV	3/4 & 2/3	6(110/670)
	Globecast	12.564V/T13	2+ TV	2/3	30(000)
	UBI	12.613H/T14L	11+TV	3/4	22(500)
	UBI	12.640H/T14U	11+TV	3/4	22(500)
	Globecast 1	12.658V/T7	14TV, 15 radio	2/3	30(000)
	UBI	12.674H/T15L	11+TV	3/4	22(500)
	UBI	12.701H/T15U	11+TV	3/4	22(500)
	WA ABC	12.702V	1 TV, 1 radio	7/8	14(288)
	WA SBS	12.720V	4TV, 2 radio	5/6	12(600)
	WA GWN/WIN	12.738V	2TV	7/8	14(295)
C1/156E	Internet tests	12.288V/T1L	no regular TV	1/2 - ?	28(650) (?)
	Aurora	12.324V/T1U			
	Pay TV	12.365V/T2	11TV, 2 radio	3/4	27(800)
	Aurora Home	12.407V/T3	5 TV, 13 radio	2/3	30(000)
	Pay-TV	12.447V/T4	5TV, 4 data	3/4	27(800)
	Pay TV	12.487V/T5	3+ TV, data	3/4	27(800)
	Aurora 2	12.527V/T6	7TV, 20 radio	3/4	30(000)
	Pay-TV	12.567V/T7	10 TV	3/4	27(800)
	Pay-TV	12.607V/T8	10 TV	3/4	27(800)
	Pay-TV	12.647V/T9	10 TV	3/4	27(800)
	Pay-TV	12.692V/T10L	6TV, 27 radio	1/2	28(650)
	Aurora MUX	12.728V/T10U	4TV, 17 radio	1/2	24(450)
	Austar	12.305H/T11	6TV, 24 data	3/4	30(000)
	Pay-TV	12.358H/T12	10 TV	3/4	27(800)
	Pay-TV	12.398H/T13	10 TV	3/4	27(800)
	Pay-TV	12.438H/T14	6TV, 3 data	3/4	27(800)
	Pay-TV	12.478H/T15	10 TV	3/4	27(800)
	Pay-TV	12.518H/T16	10 TV	3/4	27(800)
	Pay-TV	12.558H/T17	10 TV	3/4	27(800)
	Pay TV	12.598H/T18	10 TV	3/4	27(800)
	Pay-TV	12.638H/T19	10TV, 30 radio	3/4	27(800)
	Pay TV	12.688H/T20	11TV	3/4	27(800)
B1/160	Central 7	12.365H	1 TV, 1 radio	3/4	6(100)
	Occ. feeds	12.384V	1 TV - *	3/4	6(111)
	Imparja mx	12.379H	2TV + 8 radio	3/4	5(424)
	7 digital feeds	12.397H	1TV	3/4	7(200)
	Feeds to NZ	12.411V	1 TV	3/4	6(111)
	SBS Mux	12.420H	3+ TV, 2+ radio	5/6	12(600)
	TVNZ Tests	12.483V	up to 8TV	3/4	22(500)
	Sky NZ	12.519/546V	7TV/7TV	3/4	22(500)
	Sky NZ	12.581/608V	6TV/6TV	3/4	22(500)
	Sky NZ	12.644/671V	9TV	3/4	22(500)
	ABC western	12.610H	5TV	7/8	14(3288)
	Sky NZ	12.707/734V	8+TV	3/4	22(500)
P8/166E	ABS-CBN	12.575H	4+TV, 4+ radio	2/3	13(845)
	NZ tests	12.642V	up to 8 TV	3/4	28(060)
	JEDI/TVB	12.686H	11+ TV	3/4	28(126)
	ABC A-P	4180/970H	2TV, 2 radio	3/4	27(500)
	Disney Pac	4140/1010H	typ 6 TV	5/6	28(125)
	Taiwanese MUX	4080/1070H	12+ TV	5/6	30(000)
	NHK Joho	4060/1090H	7TV, 1 radio	1/2	16(180)
	FOX Mux	4040/1110V	up to 5TV	7/8	26(470)
	NET +	4121/1029V	1 TV	3/4	4(774)
	ESPN USA	4020/1130H	8+TV, data	3/4	26(470)
	Discovery	3980/1170H	8 typ.	3/4	27(690)
	CalBqt/Pas8	3940/1210H	up to 3+ FTA	7/8	27(690)
	CNBC HK	3900/1250H	up to 7TV	3/4	27(500)
	FilipinoMUX	3880/1270V	up to 8TV+radio	5/6	28(694)
	TaiwanBqt	3860/1290H	12TV + 30 r	5/6	28(000)
	CCTV Mux	3829/1321H	up to 4 + 1 radio	3/4	13(240)
	TVBS-N	3836/1314V	IFTA, 4+ CA	3/4	17(500)
	EMTV PNG	3808/1342V	1 + 2 radio	3/4	5(632)
	CNNI	3780/1370H	3, up to 5 TV	3/4	25(000)
	Discovery Asia	3764/1386V	Up to 6 TV	3/4	19(850)
	MTV	3740/1410H	8	2/3	27(500)
P2/169E	WA Mux Pv	12.281V	3+ TV, radio	2/3	27(500)
	Ariang Tv	12.401V	1TV	3/4	4(400)
	ABS-CBN	12.575H	4TV, 2 radio		13(845)
	Test mux	12.715H	6+ TV	2/3	30(000)
	TARBS feeds	4090V/1060V	9TV + radio	3/4	21(000)
	BBC India	3.915/1235V	1TV	3/4	6(620)
	BBC SCPC	3986/1164H	1TV	1/2	5(700)
	Middle East	3836/1314V	4 typ	3/4	13(331)

Receivers and Errata

FTA ; Singapore 23hrs, Brunei 1 hr; Brunei V1200 was on 4048V; New Caledonia, parts of Australia

FTA SCPC; or, 3774H, 6.520, 3/4 (June 06)

Irdeto 2; 4060V HDTV CA; also try 4020V

PowerVu; some FTA (Ch. 1 & 3)

CA & FTA NTSC: Japan, Taiwan

(ApStar 6: also 4180V same #s; some analogue also)

also try 3660/3540Vt, Sr 30.000, 3/4; some FTA

North beam; also try 3875R, 12.475, 1/2

Strong NZ & Australia; may now be 1/2, 6.525

Aust East beam - 3 FTA + 14 CA

WA only? Skew path, intended Asia

Was B1; moved June 2006, concerns B1 failures

differs from 12.407 C1; tune ch FTA; NZ+Au

Now Irdeto V2

NZ + Au, FTA + Mcript CA

occ feeds, NZ + Au; recently 12.553V

30(000)

AMTV, Healing only FTA svcs now here

High performance beam; not NZ; new CA 07-06

High performance beam; not NZ; new CA 07-06

NZ + Au (Mcript, PowVu capable)

High performance beam; not NZ; new CA 07-06

High performance beam; not NZ; new CA 07-06

ABC WA tests, FTA

SBS, radio tests WA FTA

Irdeto V2 CA, tests (GWN, WIN)

Now on Australia + NZ beam; SCPCs

not currently in use

Tests, SBS-NDS CA, others FTA when here

NZ (90cm) + Australia (Only C1 svc left on NZ)

Australia NA only (leakage to Norfolk, New Cal)

Australia NA only (leakage); 9-Net x 3 widescreen

Arrow radio (still here), tone FTA

Pay-per-view movies; CA

Pay-per-view movies; CA

Pay-per-view movies; CA

ABC for Foxtel/Austar; previously 12.288V

changes September 2005

Austar inter; Expo FTA

NDS CA + Mcript; CA

CA, subscriptions available Australia, Norfolk

Sky News active; 'Help x 2' FTA

CA, subscriptions avail Au, Nrlk; TVSN FTA

CA, subscriptions available Australia, Norfolk

"Home" CA, subscription available Australia, Nrlk

CA, subscriptions available Australia, Norfolk

CA, subscription available Australia, Norfolk

CA, subscription available Australia, Norfolk

also reported B3, 12.310H

* - plus 12.293V, 402V, 411V, 451, 460H

PIDs vary; also try 12.360, 12.370

occ. digital feeds; typ fta

Often NTSC; USA-Australia-NZ

Also 12.437H, 12.456H same params; HDTV+WS

(12.456 now shut down); 16.9 added late July

NDS CA, subscription available NZ

NDS CA, subscription available NZ

NDS CA, subscription available NZ

also see 12.610, .626, .643, .670, .688, & .706H

NDS CA, subscriptions available NZ

CA

Testing new NZ Ku beam

June 2002-Irdeto-2 CA

Dateline west; also east PAS2, 3901V

PowVu CA

Tests - CA service announced

PowVu CA & FTA; sub available-changes 05-06

was PAS-2, previously 3992Vt; feeds FTA

NET25 + FTA; new PIDS April '03; reload

PowVu CA; ch 11 DCP-CCP bootload; audio FTA

PowVu/CA (some audio FTA)

PowVu CA & FTA (EWTN + CBS + TBN +)

NDS CA (6 channels); one test card occ FTA

Myx FTA V1960, A1920 + radio FTA

Mixed FTA & CA; STC gone (CA)

PowVu FTA, replaces PAS-2 svc

CCTV cross pole, new SR 04-06

PowVu CA

PowerVu; some audio FTA

PowerVu; Asian MUX; new parameters Nov '03

8 MTV China FTA V289, A290; rest CA

PowVu CA, WIN, ABC NT, SBS; status unknown

Test - may not stay permanently

Temp FTA; subs Aust 011-800-2270-0722

initially with 6 NTSC colour bars

Occ FTA (Chile +); BIG power reduction Nov 03

Started 07-06; India test service

BBC World moved here January 2005

Subscriptions available; Strong Technology

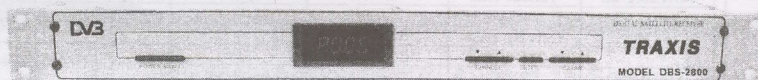


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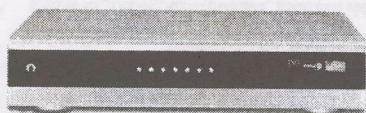
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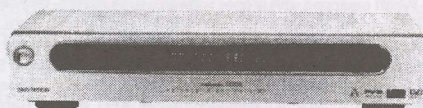


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- ◆ Ethernet port supported
- ◆ 2 x Card slots & 2 x CI slots
- ◆ HDD not included. Up to 250GB can be installed

\$AU599 inc GST

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
(PAS2/169E)	Adventists.tv	4040/1010H	1	2/3	5(900)
	Feeds	3868/1182H	1	2/3	6(620)
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(620)/7(498)
	Cal PowVu	3901/1249H	up to 8	3/4	30(800)
	HK bouquet	3850/1300H	up to 8	2/3	24(900)
	Korean Bqt	3771/1379H	1	3/4	6(510)
AMC23/172E	Various-tests	12.730H	up to 8	3/4	30(000)
1804/174E	iPSTAR	12.619H	1	2/3	25(220)
	Tests-NZ beam	12.646H	1	3/4	22(418)
	RFO Poly	4027/1123R	1TV	3/4	4(566)
1701/180E	TNTV	11.060&11.514V	9	3/4	30(000)
	TVRFO	11.136V, 11.174V	6+TV, 3+ radio	3/4	23(149)
	Canal+Sat	11.610H	16TV, 1 radio	3/4	30(000)
	PBS	12.648HH	16TV possible	3/4	28(066)
	TVNZ/BBC	4186/964RHC	1	3/4	5(632)
	TVNZ	4178/972RHC	1	3/4	5(632)
	AFRTS DTS	4175/975L	3 TV, 3 radio	2/3	3(680)
	TVNZ/Aptn	4170/980RHC	1	3/4	5(632)
	Fiji Sky Pacific	4095/1055LHC	6TV + future radio	3/4	16(505)
	Fiji Sky Pacific	4055/1095LHC	7TV + future radio	3/4	16(505)
	TVNZ/feeds	4052/1098RHC	1	3/4	5(632)
	TVNZ feeds	4044/1106R	1	3/4	5(632)
	NBC to 7 Oz	3960/1190R	1	7/8	6(447)
	TBN Mux	3927/1223R	4TV	2/3	11(394)
	WorldNet	3886/1264R	1TV, 37 radio	3/4	25(000)
	Ioarana	3772/1378L	1	3/4	4(566)
	NASA TV	3854/1296R	1 TV	3/4	2(000)
	TVNZ	3846/1304R	1	3/4	5(632)
	NBA (Barker) Ch	3803/1347R	1	3/4	6(111)
	USA feeds	3749/1401R	4?	?	26(400)
NSS-5/177W	Pacific IP Data	3763/1387R	none-data	3/4	27(500)
	RFO/Tempo	3920/1230R	1	3/4	2(893)
	BYU-TV	4185/965R	1TV, 20+ audio	1/2	6(525)
	Australia Temp.	12.522V	8 SCPC	7/8 & 5/6	14.294 & 12.600
	iPSTAR Tests	12.691V	8 TV	5/6	17(600)

Receivers and Errata

New December 2003; 24/7 "Hope Chs."

FTA (occ sport); also try 3863, Sr6.100

FTA-typ NTSC-occ sport, live Shuttle

PowVu CA + FTA (includes BBC-W 05-05)

was 4148Vt; some FTA

Korean MUX, reload 12-04; new Sr

Testing on NZ/East Australia beam

Tests, late May start; also 12.646H

Testing possible data links; June 2003

SE spot beam; was 4027LHC

east spot; 10TV + r each, vertical pol.

FTA 11.136 Tahitian beam, 11.174 west beam; 12/04

1+ FTA, MediaGd "2"; + 10.975 weaker

Testing Fiji region pay-TV (MDS) package (Oct '04)

DMV/NTL early vers. occ feeds, typ ca

DMV/NTL early vers., occ feeds, typ ca

'DTS Direct to Sailors; audio previously FTA - gone

DMV/NTL early vers. occ feeds, typically ca

Nagravision CA (> Feb 1, 2005) New PIDS

All now (including Fiji 1) CA; 7 Feb, 2005)

DMV/NTL early vers., occ feeds, typ ca

SCPC, mixed CA and FTA feeds

CA, Leitch encoded

January 2006-now 4 channels, new Sr

New PIDs Dec 03 very strong NZ, Pacific

FTA SCPC; East Hemi Beam-Tahiti

24/7 live NASA - West Hemi bm (can be difficult!)

SCPC, mixed CA & FTA, feeds

NBA feeds - probably CA - new Nov 2003

16-QAM (not MPEG-2 compatible)

Data only but useful for dish alignment

Wallis & Futuna Island(s) service

Global beam - requires sizeable dish

Aust beam: 12.522, 538.555, 574.604, 621.639 & 657

CA Tests - Taiwan TV; data coming?? (NZ beam)

MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. AV-COMM P/L, 61-2-9939-4377.

AV-COMM Tiny Tot. FTA, 12Vdc operated, palm sized, low power consumption; review SF#120. Contact # above.

Coship 3188C. Review SF#107. Blind search FTA rcvr; works well. Phoenix Technology Group (www.phoenixsatellite.com.au) (Irdeto 2 as well as FTA versions)

Coship FTA, CA, HDD. Review SF#143, state of art functions, blind search. Phoenix (above), Satlink.NZ.fax64-9-814-9447.

Divitone: "Left-handed" review SF#115; does "code key" entry. Available <http://www.satmax.ws>

eMTech eM-100B (FTA), eM-200B (FTA + Ctx2), eM210B (FTA + 2xC1 + positioner); KanSat 61-7-5484 6246 (review SF#89)

eM-150/Homecast. FTA + embedded multi-format, review SF#144. Sciteq (61-8-9409-6677) and Kristal (61-7-4728 7704)

Fortec Star Lifetime. Two versions, both blind search, code-key programmable, one X 2 CI. Review SF#119. www.aDigitalLife.com

Homecast (em-150, em-1150, eM-2150) series of FTA, CA, HDD state of art STBs, review SF#144. Sciteq (www.sciteq.com.au)

Humax ICR1 5400 (Z). Embedded Irdeto + 2 CAM slots; initial units had NTSC glitch, now fixed. Widely available; new software avail 04-04, SF#76.

Humax IRCI 5410 (Z). Adaptable version capable of holding multi-CA systems (SF#98, 99). Widely available; original importer Sciteq (www.sciteq.com.au).

Hyundai-TV/COM. HSS100B/G (Pacific), HSS-100C (China) FTA. Different software versions; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also good; later 5.0 not good.

Hyundai HSS700. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8902.

Hyundai HSS800CI. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.

INNOVIA IDS3088. Review SF#111. Blind search FTA receiver. High quality IRD; available Phoenix Technology Group, and Satmax (<http://www.satmax.ws>).

ID Digital CI-24 Sensor. New August 2003; new lower noise tuner, extra sensitivity; CI Interface slot Irdeto 1 & 2; review SF#109. Sciteq 61-8-9409-6677.

KSF-570 FTA digital receiver, import; KSC-570 adds CI x 2 (no test or user results available). Asoft Limited, 64-4-234-1096

KSC-N550H2 'Premium Dual DVB' digital receiver (no test or user results available). Asoft Limited, 64 4 234 1096

MediaStar D7.5. New (May 00) single chip FTA; review June 2000 SF. MediaStar Comm. Int. 61-2-9618-5777 (www.mediastar.com.au)

MediaStar D10. FTA and Irdeto embedded CA. VG receiver; see review SF#96, August 2002. Contacts immediately above.

MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738

Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. SF#95, p. 14.

Nokia 9200/9500. When equipped with proper software, does Aurora, originally did pay-TV services provided software has been "patched" with "Sandra" or similar program. See SF#95, p. 14, SF#96 p. 15. [SatWorld](http://www.satworld.com) 61-3-9773-9270 (www.satworld.com)

Pace DGT400/DVR500. Originally Galaxy (Now Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818). UECs replaced.

Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version (see SF#115, p. 15).

Phoenix 111, 222, 333 models (no longer produced): Service, backup - Phoenix Technology Group 61 3 9553 3399; www.phoenixsatellite.com.au

Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCal ++687-43.81.56)

PowerTek (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA (NHK, CMT etc). For service only - call Scientific Atlanta 61-2-9452-3388. For revision model D9850, see Scientific Atlanta (below).

PowTek. Blind Search Chinese sourced, field tests rate it highly. Source jason@adigitalife.com

Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.

SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL. (Skyvision Australia 61-3-9888-7491, Telsat 64-6-356-2749); no longer available.)

SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - (Skyvision - see above); no longer available.

SATWORK ST3618. Blind search FTA receiver. Fast search, problems, especially in "memory-filing" system; review SF#111. Available DMSi at tim@dmsiusa.com

SATWORK ST3688. Blind search, 3000+ ch memory, multi-format RF modulator; improved version 3618. Review SF#113; available DMSi (above).

Scientific Atlanta D9223, D9234, D9225. Orig. PowerVu, superseded Dec 2003 by D9850. Commercial receiver, available TVO 61-2-9281-4481, John Martin

Strong Technologies SRT2620. SCPC, MCPC FTA, exc sensitivity, ease use, programming. Review SF#91 (ph. below).

Strong SRT 4600. SCPC, MCPC, PowerVu; exc graphics, ease of use, review SF#64. Strong Technologies 61-3-8795-7990.

Strong 4800. SCPC, MCPC, embedded Irdeto+ CAM slots, does code-key with additional software, Aurora. Strong Technologies 61-3-8795-7990.

Strong 4800 II. SCPC, MCPC CAM slots x 2 for Aurora +, Zee, Canal +, code key with additional software. Strong Technologies (above); review SF#103.

Strong 4890. SCPC, MCPC, 30Gb PVR, 2 CAM slots, DiSEqC 1.0, 1.2 (review SF#84), does code key with additional software. Strong Technologies, # above.

UEC Atlas/Titan (1000). New July 2003, replacing DGT400 for Austar. No SCART, L-band loop; also available Rural Electronics 61-2-6361 3636.

UEC642. Designed for Aurora (Irdeto), approved by Optus; w/new software, C-band FTA; faulty P/S. Norsat 61-8-9451-8300.

UEC660. Upgraded UEC642, used by Sky Racing Aust., Foxtel, limited FTA. (Nationwide - 61-7-3252-2947); P/S problems.

UEC700/720. Single chip Irdeto built-in design for Foxtel; unfriendly for FTA. Power supply problems, seldom sold to consumers; propensity to fall off back of trucks.

"X" Digital. When modified with "aftermarket" Internet software, does Aurora and other V-1 CA without card; review SF#119. Strong Technologies (61-3-8795-7990).

Accessories:

Aurora smart cards. MCRYPT (Irdeto V2) cards now available (Jan 2005), Sciteq 61-8-9409-6677.

PowerVu Software Upgrade: PAS-8, 4020/1130Hz, Sr 26.470, 3/4; pgm ch 11 and follow instructions (do not leave early!)

PowerVu (Pacific) repair service: Cable & Sat Svcs, Darius West, 61-2-9792-1421 (Email darius@cases.net.au)

WITH THE OBSERVERS

AT PRESS DEADLINE

Amusing technical problem timing? C1 Aurora 12.407V "Info 156E" channel rotating pages (11 total) stuck on page 7 which reads fulltime - "In case of problems contact your equipment supplier ..." Do as I say, not as I do??? B3 ABC feeds every afternoon 12.328H, 6.980, 3/4; ABC Rugby 12.319H, 6.980, 3/4.

Launch schedules: Optus B1, scheduled for replacement by D1 September-October now using inclined orbit (figure 8) automated tracking to conserve remaining station keeping fuel; a proud, old, warrior nears the finish line. JCSAT10 scheduled mid-August launch to 128E, replacing JCSAT3 with C (Asia footprint) and Ku (Japan only) capabilities.

AMC23/172E: "Strong carriers here on 3.700H, 3.788H, 4060V." (D. Leach. NSW)

AsiaSat 3S/105E: "Yanbian Satellite TV, Jilin TV now on 3.671V, Sr 8.932, 3/4." (Arnold)

AsiaSat 2/100.5E: "Major new MCPC 3.820V, Sr 27.500, 3/4 apparently ArabSat services, began by paralleling As3S 3.880H." (Gerald)

AsiaSat 4/122E: "CCTV9 now on 3820V, FTA." (Gerald)

Intelsat 701/180E: Reminder that VOA will shut-down this transponder service (3.886R) for POR (Pacific Ocean Region) September 30.

PAS-2/169E: "BBC World targeting India is new on 3.915V, Sr 6.620, 3/4; reportedly a temporary test feed." (Gerald)

Optus B1/160E: "Central 7, Taima Radio remain on 12.365H, Sr 5.100." (Arnold) Editor's note: Conflicting reports about this - also see B3.) "Reminder: TVNZ has shut down 12.456V and is now, with reduced programming, only on 12.483V (Sr 22.500)." (Orbie)

Optus B3/152E: "Contrary to some reports, Central 7 feed continues to be at 12.310H, Sr 5.100, 3/4. The ABC now runs news feeds (into Sydney) from all states and territories on 12.328H, Sr 6.980, 3/4 - one way to see what is happening 'before' it is official, and often with segments which never make the full ABC newscasts. And, Imparja's feed to Sydney is running on 12.390H, Sr 5.423, 3/4. A note - their ICTV (Indigenous Community TV) programme channel has developed a diagonal noise bar(s) through the video image, possibly from a faulty SMPS (power supply). Finally, TVN feeds by Globecast primarily feeds remote pickups on 12.553V, Sr 6.669, 3/4 and recently all feeds have been 16:9 rather than 4:3." (IF, Qld.) Editor's note: A segment from TVN made the MSNBC 'Countdown' August 4 (5th here) show demonstrating a device to create cookie batter directly to a baking cookie sheet. The idea was the machine would pop out perfectly formed cookies (round) whereas in fact it shoots out something that looks like doggy-poop. The TVN presenters 'lost it' during the demonstration and millions of Americans now wonder why Australian cookies have the

On www.bobcooper.tv August 15-September 15

Perspective 1: "Story of Early Consumer Packages"

Perspective 2: "Story of who the users were"

Perspective 3: "Private TVRO Terminals"

Classic Video: "FCC Approval of C-band Dishes" - launch of legal TVRO

And brand new 'C-Band Remembered' pioneering stories as they are now being collected for publishing in a new book available April 2007.

UBI's changeover to Irdeto 2

In mid-July UBI began their final steps in converting from MDS CA to Irdeto V2 on the 5 in-use MCPCs (B3). One side effect - the PIDs on most channels have also changed. After 3 days, UBI switched on the V2 encryption for a number of channels such as Latin, Portuguese and Iranian and added Turkish channel 'Euro Star' as well as a new Greek channel labelled 'Channel 10.' At the same time, previous test MCPC T11/upper, 12.452H, Sr 22.600, 3/4 became a formal part of the network (UBI's 6th MCPC) with (at that time) a total capacity of 78 TV channels + radio. The new MCPC began by airing 'Dubia Sport,' 'Dubia TV,' and 'Mazzika Zoom' (an Arabic youth channel).

Around July 20th UBI updated their EPG but in the process made a mistake - 'SCTV' is incorrectly listed as 'Sydney Community Television' whereas the 'S' correctly should be for 'Satellite' (let us see how long they take to repair this mistake after receiving SatFACTS around the 20th!) There are other possible mistakes here. A Macedonian radio channel has been added as a second audio track to Macedonian TV (T11/12.425H MKTV) has two audio tracks, 642 which is the stereo sound of the TV service and 667 being a mono radio service. Later in July, 'Tele Liban' dropped the shared feed from 'Al Shasha' moving the latter to T11/upper. Then just before August began, those channels not functioning with Irdeto V2 switched it on leaving only 'Kurdistan TV,' 'SCTV,' and 'Ch72/informational channel' FTA. And Al Alam (Arabic news) was added to T11/upper - CA. (IF, Qld.)

physical form of dog crap. "T5/12.525V, Sr 30.000, 2/3 - Duna Channel went CA during July (V=2665, A=2625).

WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. **Photos of yourself, your equipment** or off-air photos taken from your TV screen **are welcomed.** TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady.

Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you.

Deadline for September 15th issue: September 4th by mail or 5PM NZT September 5th if by fax to

64-9-406-1083 or Email skyking@clear.net.nz.

Update: C-Band (20 year) Reunion

April 19-21 in Atlanta, Georgia (USA), at the pristine Atlanta Convention Center, the event of a satellite-lifetime. Satellite Expo 2007 (<http://www.satelliteexpo2007.com>) will be attended by hundreds of C (and Ku) band satellite pioneers from throughout the world, including many who have already registered from Asia, Australia, New Zealand and the Pacific. Did you ever dream of meeting and talking with England's Steve Birkill, Australia's Garry Cratt, the 'mysterious' 'IF from Queensland' or Coop? This is the once-in-a-lifetime opportunity to find the original creators of home-satellite-TV in one room at one time!

Satellite Expo 2007 is America's premiere trade show on the coming year - thousands will attend, a huge convention centre filled with the latest hardware on display. And preceded (April 18) by 'Certificated Classes' teaching every aspect of modern satellite communications.

As a part of this extravaganza, during the 'Exhibit-Hall-Open' dates (April 19-20-21), a special area where the real pioneers in home dish reception (the "C-band guys and gals") will gather to witness 1980-era vintage videos of what they did and the industry they created. On Friday April 20th, a "C-Band Pioneer Reunion Dinner" program sponsored by one of the leading firms to launch home TVRO, Chaparral Communications. Limited seating (300 people) at this event - and the seats are going very fast! Attendees will meet and rub elbows with the legendary pioneers of home-dish reception, the creators of today's industry, witness a 'floor show' second to none, and receive a "memento" of incredible value just for attending!

There is more. As a part of the "C-Band Reunion" a new book titled "C-Band Remembered" will be available to attendees - individual pioneer reflections of how they, individually, remember those "glory days" that launched the home DTH industry - stories told by the pioneers in their own hand.

If you only attend ONE satellite event in your lifetime, this should be the one. Everything you dream about will be on hand for 3 or 4 very busy days - including a full program of "C-Band Pioneer" seminar sessions where the original pioneers of this industry will deliver papers tracing how it all happened, and how the technology has matured dramatically from 1979's launch of home dish systems.

A sizeable "antenna farm" loaded with the latest hardware, a collection of past and present technologists led by Mike Kohl of Global will be there, to a schedule, to take you step-by-step from 1979 to the present.

This is the ONE event you will remember for a lifetime - it will not be repeated and this collection of technologists and history (past and present) will never again assemble.

Information? www.bobcooper.tv and click on "C-band Reunion," and register at <http://www.satelliteexpo2007.com>.

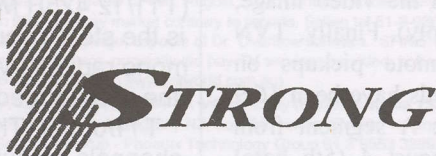
Yes - Chris Clarke will be there with his infamous 'dark-side-of-the-street pass.'

SATWORLD

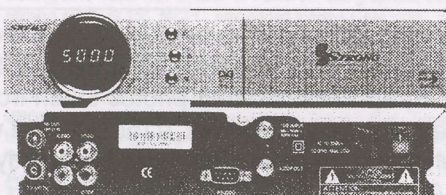
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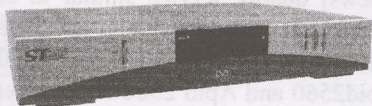


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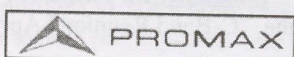
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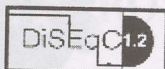
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Sigaram (Indian) channel went FTA around 28 July, probably a short period promotional move. T7/12.657V, Sr 30.000, 2/3 'Set-Max-Vision Asia 3' (V=1360, A=1320), FTA for several months, returned to CA 2 August. TBN's 'Smile of a Child' has moved from T13 to T7 using previous Duna TV PIDs (V=502, A=550). T13/12.563H, Sr 30.000, 2/3, has only Globecast Adhoc channel FTA which fluctuates between test card, AMTV(Australian Multicultural TV) and 'Now TV' which comes from AsiaSat 3 C-band (3.760H). (IF, Qld.) "SBS returned here late July, 12.420H, 12.437H, 12.456H - all Sr 12.600, 5/6." (GS, SA)

Optus C1/156E: "T3/12.407V, Sr 30.000, 2/3 (Aurora) has modified the 'Info 156E' by adding photos displaying the front and back of the 'new' (Aurora) smart-card; purple in colour, labelled 'Epsilon Irdeito.' Here's a mystery for trivia fans: The contents of the Seven Central (Aurora) EPG is rarely the same as the Seven Central feed on B3. For example, on an episode

of 'MASH,' the feed to Sydney contained 40 words while the Aurora channel EPG cut this down to 21 words. Is this 'make work' for some underpaid Aurora/Optus employee???" (AI)

Palapa C2/113E: "SCTV, 3.934H, Sr. 6.620, 3/4." (Ed)

Thaicom 5/78.5E: "There are slightly better signals levels than the previous Thaicom 3 at this location. An example: 'KCTV' which was just on threshold is now solidly above threshold. 'Russia Today' (English language news channel) is currently being fed here, apparently this is used by B3's relay of the same service." (D. Mitchell, NSW) (Editor's note: 'Russia Today' for those who have not taken a look is a very high [visual and news] quality service similar in concept to CNN or even BBC with the perspective that goes with being a [large] independent country. Try B3's 12.525V, Sr 30.000, 2/3 [yes - into NZ], Vpid2560 and Apid 2520 for an alternative to the usual USA-slanted coverage of world events.) (IF, Qld.)

Soapbox: "There is an interesting historical four-sided 'lenticular view' coin from www.perthmint.com.au which honours the 50 year birthday of television in Australia. There are six images embedded in the coin which 'magically' change before your eyes, each representing an early Australian-originated television programme. (Only) 12,500 are to be 'struck' (minting language phrase), the 99.96% pure-silver coins have a legal tender value of Au \$1 but you would be foolish to spend it that way after paying \$85 plus GST plus shipping for it!" (IF, Qld.) "HD-DVD Blu-Ray software designed to inhibit/prevent making HD copies has been defeated by a German magazine test: Press Print screen button on PC (can be automated) allows frame by frame copying." (Gerald)

Presstime: Sir Arthur C. Clarke will make a presentation to the "C-Band Reunion" April 20th, Atlanta, Georgia.

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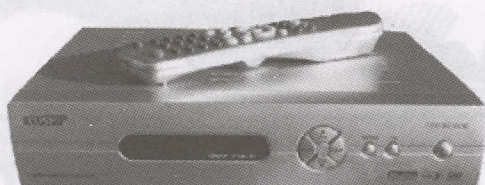
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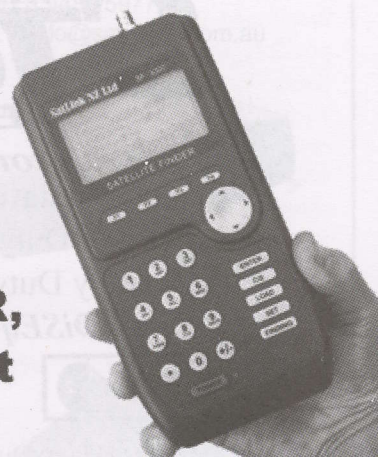
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Book Review:

Television's Pirates: Hiding behind your picture tube

by Robert B. Cooper

reviewed by H. Paul Shuch

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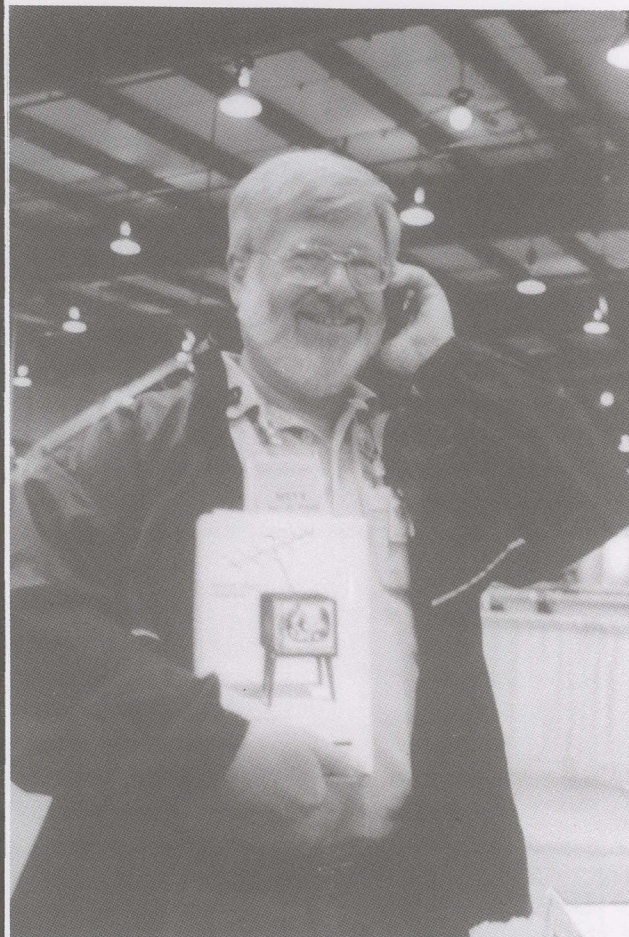
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At the May 2006 Dayton (Ohio) Hamvention, the world's largest amateur radio convention, I had the pleasure of running into an old friend, journalist and TV technologist Bob Cooper, K6EDX/ZL4AAA. Although never a SETI League member, Bob is owed a huge debt of gratitude by those of us who repurpose surplus satellite TV dishes to our particular interest. Almost single-handedly, Bob gave birth to the industry that created our dishes. This book, his personal memoir and a history of the satellite TV revolution, is must reading for those of us who point our reflectors at the stars.

"Television's Pirates" traces the development of satellite TV from the early days of cable television (Coop was himself an early cable TV system designer and operator), all the way through to today's ubiquitous half-meter offset fed dishes feeding Direct Broadcast video to hundreds of millions of households worldwide. Along the path, he reveals inside secrets of the pirates who brought about this technological revolution, motivated by fame, fortune and the challenge of the game. It should surprise no reader that many of the original satellite pirates are now SETI League members. But some of what happens along the road, as revealed by Coop for perhaps the first time, impresses even me (*and I was there!*).

During the 1970s, a handful of hams (your humble reporter included) vied for the honor of becoming the first to intercept and decode video-modulated photons from space. It's reminiscent of our present race to be the first to detect ETI, and the parallels will amaze you. One of our number (now sadly departed) early declared himself to be the 'Father of Satellite Television'. Bob Cooper examines Tay Howard's claim and makes a good case that the title rightfully belongs to our very own Life Member and Advisory Board stalwart Sir Arthur C. Clarke. Coop also makes public the intrigue, subterfuge, competition and cut-throat commercialism that led to competing claims and counter-claims, even up to the present.

On a personal note: in his book, Bob Cooper generously helps me to secure my own small place in Satellite TV history. Most of his facts are accurate. Most of his words are eloquent (even those that are unfortunately misspelled, due in part to this publication being rushed to market without benefit of adequate proof reading.) And most of his pages are so engaging that you won't want to put the book down until you have devoured them., all 928!



H. Paul Shuch in Dayton at Hamvention

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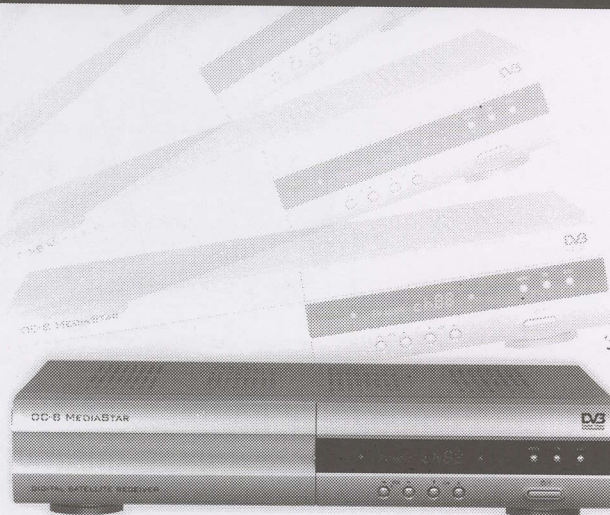
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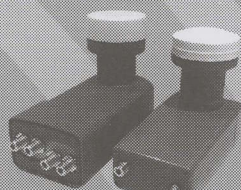


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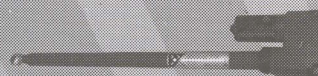


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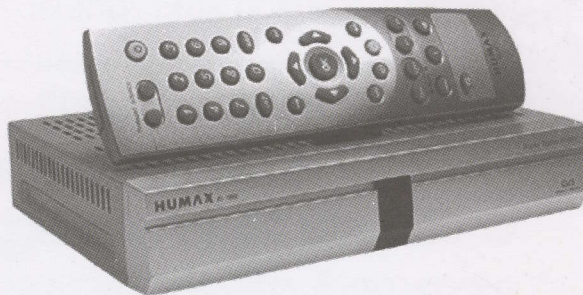
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